

Caldwell Solar, Caldwell County,
Kentucky

APPENDIX

C

WETLAND DELINEATION DATA
SHEETS – EASTERN MOUNTAINS
AND PIEDMONT REGION

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0001
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.155440 Long: -87.987390 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) _____ Water-Stained Leaves (B9) _____ High Water Table (A2) <u>X</u> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) _____ True Aquatic Plants (B14) _____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) _____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Iron Deposits (B5) _____ Thin Muck Surface (C7) _____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)	_____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>12"</u> Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0001

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Packera glabella</u>	10	No	OBL
2. <u>Carex tribuloides</u>	10	No	FACW
3. <u>Lysimachia nummularia</u>	40	Yes	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>10</u>	x 1 = <u>10</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>60</u> (A)	<u>110</u> (B)
Prevalence Index = B/A = <u>1.83</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/1	85	10YR 4/6	15	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0002
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): _____
 Slope (%): 3% Lat: 37.154810 Long: -87.987210 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0002

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Taraxacum officinale</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
2. <u>Poa pratensis</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Schedonorus arundinaceus</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Stellaria media</u>	<u>10</u>	<u>No</u>	<u>UPL</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>95</u>	x 4 = <u>380</u>
UPL species <u>10</u>	x 5 = <u>50</u>
Column Totals: <u>105</u> (A)	<u>430</u> (B)

Prevalence Index = B/A = 4.10

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	5YR 5/6	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0003
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Foothlope _____ Local relief (concave, convex, none): concave
 Slope (%): 4% Lat: 37.157720 Long: -87.978910 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0003

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	30	Yes	FACW
2. <u>Morus alba</u>	10	No	UPL
3. <u>Gleditsia triacanthos</u>	40	Yes	FAC
4. <u>Prunus serotina</u>	10	No	FACU
5. <u>Juglans nigra</u>	10	No	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	100	= Total Cover	

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	_____	= Total Cover	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Viola sororia</u>	25	Yes	FAC
2. <u>Elymus virginicus</u>	40	Yes	FACW
3. <u>Ambrosia trifida</u>	10	No	FAC
4. <u>Conium maculatum</u>	10	No	FACW
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	85	= Total Cover	

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>80</u>	x 2 =	<u>160</u>
FAC species <u>75</u>	x 3 =	<u>225</u>
FACU species <u>20</u>	x 4 =	<u>80</u>
UPL species <u>10</u>	x 5 =	<u>50</u>
Column Totals: <u>185</u> (A)		<u>515</u> (B)
Prevalence Index = B/A =		<u>2.78</u>

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0004

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.157930 Long: -87.975980 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0004

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Ulmus americana</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Platanus occidentalis</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphotrichum lanceolatum</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Packera glabella</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>85</u> (A)	<u>165</u> (B)
Prevalence Index = B/A = <u>1.94</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0004

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10yr 4/1	85	10yr 4/6	15	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0005

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 3% Lat: 37.158590 Long: -87.978330 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0005

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Gleditsia triacanthos</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Morus alba</u>	<u>10</u>	<u>No</u>	<u>UPL</u>
3. <u>Celtis laevigata</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>80</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>130</u>	x 2 = <u>260</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>50</u>	x 5 = <u>250</u>
Column Totals: <u>205</u> (A)	<u>590</u> (B)
Prevalence Index = B/A = <u>2.88</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Elymus virginicus</u>	<u>70</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Conium maculatum</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. <u>Stellaria media</u>	<u>20</u>	<u>No</u>	<u>UPL</u>
4. <u>Galium aparine</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Lamium purpureum</u>	<u>20</u>	<u>No</u>	<u>UPL</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>125</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0005

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/4	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0006

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.152630 Long: -87.987740 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 12 to 20 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes <u>X</u> No _____	Depth (inches):	<u>12"</u>	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0006

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Platanus occidentalis</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Celtis laevigata</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Acer negundo</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>60</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>25</u>	x 1 =	<u>25</u>
FACW species <u>80</u>	x 2 =	<u>160</u>
FAC species <u>20</u>	x 3 =	<u>60</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>125</u> (A)		<u>245</u> (B)
Prevalence Index = B/A =		<u>1.96</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphotrichum lanceolatum</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Viola sororia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>20</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/1	85	10YR 4/6	15	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10) (MLRA 147)
- ___ Very Shallow Dark Surface (F22) (Test)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0007

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): convex

Slope (%): 3% Lat: 37.152750 Long: -87.988140 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 12 to 20 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0007

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer saccharum</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Celtis laevigata</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Ulmus americana</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>80</u>		= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphoricarpos orbiculatus</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>40</u>		= Total Cover	
Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Delphinium tricorne</u>	<u>10</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Viola sororia</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Viola pubescens</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Claytonia virginica</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
5. <u>Chaerophyllum procumbens</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
6. <u>Carex grisea</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
7. <u>Elymus virginicus</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
8. <u>Toxicodendron radicans</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
<u>105</u>		= Total Cover	
Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
_____		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 55% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>70</u>	x 2 = <u>140</u>
FAC species <u>55</u>	x 3 = <u>165</u>
FACU species <u>90</u>	x 4 = <u>360</u>
UPL species <u>10</u>	x 5 = <u>50</u>
Column Totals: <u>225</u> (A)	<u>715</u> (B)
Prevalence Index = B/A = <u>3.18</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0007

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10yr 4/3	100					Silt loam	
4-20"	10yr 4/4	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0008
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.152530 Long: -87.988670 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 12 to 20 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0008

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	<u>35</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Acer negundo</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex tribuloides</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Symphotrichum lanceolatum</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Lysimachia nummularia</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>60</u>	x 2 = <u>120</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>70</u> (A)	<u>150</u> (B)
Prevalence Index = B/A = <u>2.14</u>	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0008

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/1	85	10YR 4/6	15	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0009

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.152400 Long: -87.990330 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 12 to 20 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0009

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Xanthium strumarium</u>	<u>35</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Symphotrichum lanceolatum</u>	<u>35</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>35</u>	x 2 = <u>70</u>
FAC species <u>35</u>	x 3 = <u>105</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>70</u> (A)	<u>175</u> (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0009

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/1	95	10YR 4/6	5	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0010
 Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): convex
 Slope (%): 3% Lat: 37.152210 Long: -87.990640 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		_____ Surface Soil Cracks (B6)
_____ Surface Water (A1)	_____ Water-Stained Leaves (B9)	_____ Sparsely Vegetated Concave Surface (B8)
_____ High Water Table (A2)	_____ Aquatic Fauna (B13)	_____ Drainage Patterns (B10)
_____ Saturation (A3)	_____ True Aquatic Plants (B14)	_____ Moss Trim Lines (B16)
_____ Water Marks (B1)	_____ Hydrogen Sulfide Odor (C1)	_____ Dry-Season Water Table (C2)
_____ Sediment Deposits (B2)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Crayfish Burrows (C8)
_____ Drift Deposits (B3)	_____ Presence of Reduced Iron (C4)	_____ Saturation Visible on Aerial Imagery (C9)
_____ Algal Mat or Crust (B4)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Stunted or Stressed Plants (D1)
_____ Iron Deposits (B5)	_____ Thin Muck Surface (C7)	_____ Geomorphic Position (D2)
_____ Inundation Visible on Aerial Imagery (B7)	_____ Other (Explain in Remarks)	_____ Shallow Aquitard (D3)
		_____ Microtopographic Relief (D4)
		_____ FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0010

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	20	Yes	FACW
2. <u>Juglans nigra</u>	20	Yes	FACU
3. <u>Ulmus americana</u>	10	Yes	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>55</u>	x 2 =	<u>110</u>
FAC species <u>50</u>	x 3 =	<u>150</u>
FACU species <u>90</u>	x 4 =	<u>360</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>195</u> (A)		<u>620</u> (B)
Prevalence Index = B/A = <u>3.18</u>		

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex grisea</u>	70	Yes	FACU
2. <u>Viola sororia</u>	50	Yes	FAC
3. <u>Symphotrichum lanceolatum</u>	20	No	FACW
4. <u>Elymus virginicus</u>	5	No	FACW
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0010

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 3/3	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0011
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): convex
 Slope (%): 3% Lat: 37.150240 Long: -87.999290 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
---	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0011

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>0</u> (A)	<u>0</u> (B)
Prevalence Index = B/A = <u>0.00</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)
 There was no vegetation at this data point.

SOIL

Sampling Point: DP0011

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	7.5YR 4/3	100					Silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0012

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.150447 Long: -87.996993 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes <u>X</u> No _____	Depth (inches):	<u>6"</u>	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	
Saturation Present?	Yes <u>X</u> No _____	Depth (inches):	<u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0012

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Alisma subcordatum</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Lysimachia nummularia</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Carex tribuloides</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>20</u>	x 1 = <u>20</u>
FACW species <u>20</u>	x 2 = <u>40</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>40</u> (A)	<u>60</u> (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0012

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 5/1	85	10YR 5/6	15	C	M	Silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0013

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 3% Lat: 37.154413 Long: -87.994347 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0013

Tree Stratum (Plot size: <u>30 ft.</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Acer saccharum</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>Celtis laevigata</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>
3.	<u>Ulmus americana</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
4.	<u>Aesculus glabra</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
		<u>95</u>	= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Aesculus glabra</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>Symphoricarpos orbiculatus</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
		<u>30</u>	= Total Cover	
Herb Stratum (Plot size: <u>5 ft.</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Viola sororia</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
2.	<u>Cryptotaenia canadensis</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
3.	<u>Polypodium virginianum</u>	<u>20</u>	<u>Yes</u>	<u>UPL</u>
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
11.	_____	_____	_____	_____
12.	_____	_____	_____	_____
13.	_____	_____	_____	_____
14.	_____	_____	_____	_____
15.	_____	_____	_____	_____
16.	_____	_____	_____	_____
17.	_____	_____	_____	_____
18.	_____	_____	_____	_____
19.	_____	_____	_____	_____
20.	_____	_____	_____	_____
		<u>50</u>	= Total Cover	
Woody Vine Stratum (Plot size: <u>30 ft.</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
		_____	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 38% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>75</u>	x 4 = <u>300</u>
UPL species <u>20</u>	x 5 = <u>100</u>
Column Totals: <u>175</u> (A)	<u>590</u> (B)
Prevalence Index = B/A = <u>3.37</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0013

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	10YR 3/3	100					Silty clay	
3-20"	10YR 3/4	100					Silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0014
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 2% Lat: 37.143236 Long: -87.973538 Datum: NAD83
 Soil Map Unit Name: Otwood silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
--	---

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
--	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0014

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Carex tribuloides</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
3. <u>Schedonorus arundinaceus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>35</u>	x 2 = <u>70</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>40</u> (A)	<u>90</u> (B)

Prevalence Index = B/A = 2.25

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0014

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 6/1	90	10YR 4/6	10	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes <u>X</u> No _____</p>
--	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0015

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.143366 Long: -87.973071 Datum: NAD83

Soil Map Unit Name: Henshaw silt loam, 0 to 2 percent slopes, rarely flooded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0015

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rosa palustris</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Acer rubrum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
3. <u>Ulmus americana</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
			<u>70</u> = Total Cover

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Carex tribuloides</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Schedonorus arundinaceus</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Solidago gigantea</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. <u>Clematis virginiana</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Ludwigia alternifolia</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
			<u>80</u> = Total Cover

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
			_____ = Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>50</u>	<u>x 1 = 50</u>
FACW species <u>70</u>	<u>x 2 = 140</u>
FAC species <u>10</u>	<u>x 3 = 30</u>
FACU species <u>20</u>	<u>x 4 = 80</u>
UPL species <u>0</u>	<u>x 5 = 0</u>
Column Totals: <u>150</u> (A)	<u>300</u> (B)
Prevalence Index = B/A = <u>2.00</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0015

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 5/2	90	10YR 4/6	10	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0016

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 3% Lat: 37.141161 Long: -87.973042 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0016

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Stellaria media</u>	30	Yes	UPL
2. <u>Cardamine hirsuta</u>	20	No	FACU
3. <u>Poa annua</u>	30	Yes	FACU
4. <u>Lamium amplexicaule</u>	25	Yes	UPL
5. <u>Lamium purpureum</u>	10	No	UPL
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>50</u>	x 4 = <u>200</u>
UPL species <u>65</u>	x 5 = <u>325</u>
Column Totals: <u>115</u> (A)	<u>525</u> (B)
Prevalence Index = B/A = <u>4.57</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0016

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 5/6	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0017
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 2% Lat: 37.145972 Long: -87.985364 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, occasionally flooded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) _____ Water-Stained Leaves (B9) _____ High Water Table (A2) _____ Aquatic Fauna (B13) _____ Saturation (A3) _____ True Aquatic Plants (B14) _____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4) _____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Iron Deposits (B5) _____ Thin Muck Surface (C7) _____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)	_____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1"</u> Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0017

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.	<u>1</u>	<u>No</u>	<u>FAC</u>
2.	<u>5</u>	<u>Yes</u>	<u>FAC</u>
3.	<u>1</u>	<u>No</u>	<u>OBL</u>
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>1</u>	x 1 = <u>1</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>6</u>	x 3 = <u>18</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>7</u> (A)	<u>19</u> (B)
Prevalence Index = B/A = <u>2.71</u>	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0017

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/2	95	10YR 4/6	5	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0018
 Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.145813 Long: -87.985663 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, occasionally flooded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0018

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Acer saccharum</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Fraxinus americana</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Juglans nigra</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Acer negundo</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>90</u>	= Total Cover	

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Aesculus glabra</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Lindera benzoin</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>45</u>	= Total Cover	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Phlox divaricata</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
2. <u>Enemion biternatum</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
3. <u>Hydrophyllum macrophyllum</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
4. <u>Laportea canadensis</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>
5. <u>Poa pratensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
6. <u>Claytonia virginica</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
7. <u>Ornithogalum umbellatum</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>95</u>	= Total Cover	

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>25</u>	x 2 = <u>50</u>
FAC species <u>70</u>	x 3 = <u>210</u>
FACU species <u>130</u>	x 4 = <u>520</u>
UPL species <u>5</u>	x 5 = <u>25</u>
Column Totals: <u>230</u> (A)	<u>805</u> (B)
Prevalence Index = B/A = <u>3.50</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0018

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/3	100					Silt loam	
4-20"	10YR 3/4	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0019

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 5% Lat: 37.146465 Long: -87.992573 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0019

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	20	Yes	FACW
2. <u>Platanus occidentalis</u>	20	Yes	FACW
3. <u>Ulmus americana</u>	20	Yes	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>60</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>65</u>	x 2 =	<u>130</u>
FAC species <u>70</u>	x 3 =	<u>210</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>135</u> (A)		<u>340</u> (B)
Prevalence Index = B/A = <u>2.52</u>		

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sambucus nigra</u>	40	Yes	FAC
2. <u>Viola sororia</u>	10	No	FAC
3. <u>Cryptotaenia canadensis</u>	20	Yes	FAC
4. <u>Symphotrichum lanceolatum</u>	5	No	FACW
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>75</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0019

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/3	100					Silt loam	
4-20"	7.5YR 4/4	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

<p>Hydric Soil Indicators:</p> <p><input type="checkbox"/> Histosol (A1)</p> <p><input type="checkbox"/> Histic Epipedon (A2)</p> <p><input type="checkbox"/> Black Histic (A3)</p> <p><input type="checkbox"/> Hydrogen Sulfide (A4)</p> <p><input type="checkbox"/> Stratified Layers (A5)</p> <p><input type="checkbox"/> 2 cm Muck (A10)</p> <p><input type="checkbox"/> Depleted Below Dark Surface (A11)</p> <p><input type="checkbox"/> Thick Dark Surface (A12)</p> <p><input type="checkbox"/> Sandy Mucky Mineral (S1)</p> <p><input type="checkbox"/> Sandy Gleyed Matrix (S4)</p> <p><input type="checkbox"/> Sandy Redox (S5)</p> <p><input type="checkbox"/> Stripped Matrix (S6)</p>	<p><input type="checkbox"/> Dark Surface (S7)</p> <p><input type="checkbox"/> Loamy Gleyed Matrix (F2)</p> <p><input type="checkbox"/> Depleted Matrix (F3)</p> <p><input type="checkbox"/> Redox Dark Surface (F6)</p> <p><input type="checkbox"/> Depleted Dark Surface (F7)</p> <p><input type="checkbox"/> Redox Depressions (F8)</p> <p><input type="checkbox"/> Iron-Manganese Masses (F12)</p> <p><input type="checkbox"/> Umbric Surface (F13)</p> <p><input type="checkbox"/> Red Parent Material (F21)</p>	<p>Indicators for Problematic Hydric Soils³:</p> <p><input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)</p> <p><input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/></p>
--	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0020
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave
 Slope (%): 5% Lat: 37.148067 Long: -87.994243 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0020

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Platanus occidentalis</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
3. <u>Ulmus americana</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>20</u>	= Total Cover	
	<u>30</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>50</u> (A)	<u>100</u> (B)
Prevalence Index = B/A = <u>2.00</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0020

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/3	100					Silt loam	
4-20"	7.5YR 5/4	50					Silty Clay Loam	
4-20"	10yr 4/4	50					Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0021
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 3% Lat: 37.148495 Long: -87.990797 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) _____ Water-Stained Leaves (B9) _____ High Water Table (A2) _____ Aquatic Fauna (B13) _____ Saturation (A3) _____ True Aquatic Plants (B14) _____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Iron Deposits (B5) _____ Thin Muck Surface (C7) _____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)	_____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>12"</u> Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
--	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0021

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>110</u>	x 2 = <u>220</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>225</u> (B)
Prevalence Index = B/A = <u>1.96</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex tribuloides</u>	<u>60</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Persicaria punctata</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0021

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10yr 5/2	90	10yr 3/6	10	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0022
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 2% Lat: 37.149253 Long: -87.990736 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Surface Soil Cracks (B6)
	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
	<input type="checkbox"/> Drainage Patterns (B10)
	<input type="checkbox"/> Moss Trim Lines (B16)
	<input type="checkbox"/> Dry-Season Water Table (C2)
	<input type="checkbox"/> Crayfish Burrows (C8)
	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
	<input type="checkbox"/> Stunted or Stressed Plants (D1)
	<input checked="" type="checkbox"/> Geomorphic Position (D2)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> Microtopographic Relief (D4)
	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:	Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>12"</u>	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____	
(includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0022

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>90</u>	x 2 =	<u>180</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>90</u> (A)		<u>180</u> (B)
Prevalence Index = B/A =		<u>2.00</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex tribuloides</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Symphotrichum lanceolatum</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0022

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 5/1	85	10YR 4/6	15	C	M	Silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0023
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave
 Slope (%): 10% Lat: 37.149261 Long: -87.990405 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 12 to 20 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0023

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Quercus rubra</u>	25	Yes	FACU
2. <u>Acer saccharum</u>	80	Yes	FACU
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	80	Yes	FACW
2. <u>Fraxinus americana</u>	10	No	FACU
3. <u>Ulmus americana</u>	5	No	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	105	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>85</u>	x 2 = <u>170</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>140</u>	x 4 = <u>560</u>
UPL species <u>25</u>	x 5 = <u>125</u>
Column Totals: <u>250</u> (A)	<u>855</u> (B)
Prevalence Index = B/A = <u>3.42</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex jamesii</u>	25	Yes	UPL
2. <u>Symphoricarpos orbiculatus</u>	10	Yes	FACU
3. <u>Galium aparine</u>	5	No	FACU
4. <u>Osmorhiza claytonii</u>	5	No	FACU
5. <u>Viola pubescens</u>	5	No	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	50	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0023

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	2.5YR 3/3	100					Clay Loam	
2-20"	2.5YR 5/8	100					Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes _____ No <u> X </u></p>
--	---

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0024

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 4% Lat: 37.148564 Long: -87.986332 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes <u>X</u> No _____	Depth (inches):	<u>6"</u>	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0024

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>40</u>	x 2 = <u>80</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>40</u> (A)	<u>80</u> (B)
Prevalence Index = B/A = <u>2.00</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0024

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/2	85	10YR 4/6	15	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0025

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 3% Lat: 37.148156 Long: -87.985890 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0025

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Acer negundo</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
3. <u>Symphoricarpos orbiculatus</u>	<u>29</u>	<u>Yes</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
			<u>59</u> = Total Cover

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	<u>0</u> x 1 = <u>0</u>
FACW species <u>40</u>	<u>40</u> x 2 = <u>80</u>
FAC species <u>10</u>	<u>10</u> x 3 = <u>30</u>
FACU species <u>74</u>	<u>74</u> x 4 = <u>296</u>
UPL species <u>0</u>	<u>0</u> x 5 = <u>0</u>
Column Totals: <u>124</u> (A)	<u>406</u> (B)
Prevalence Index = B/A = <u>3.27</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex grisea</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Elymus virginicus</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Glechoma hederacea</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. <u>Symphotrichum lanceolatum</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
5. <u>Geum canadense</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. <u>Viola pubescens</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
			<u>65</u> = Total Cover

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
			_____ = Total Cover

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0025

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 6/4	85	5YR 4/6	15	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0101

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): convex

Slope (%): 3% Lat: 37.156310 Long: -88.002569 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0101

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>50</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Triticum aestivum</u>	<u>40</u>	<u>Yes</u>	<u>UPL</u>
3. <u>Oenothera biennis</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
4. <u>Rumex crispus</u>	<u>3</u>	<u>No</u>	<u>FAC</u>
5. <u>Ambrosia trifida</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>13</u>	x 3 = <u>39</u>
FACU species <u>53</u>	x 4 = <u>212</u>
UPL species <u>40</u>	x 5 = <u>200</u>
Column Totals: <u>106</u> (A)	<u>451</u> (B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0101

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/4	97	10yr 4/6	3	C	M	Loam	
4-20"	10YR 3/4	95	10YR 4/6	5	C	M	Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):	
Type: _____	
Depth (inches): _____	
	Hydric Soil Present? Yes _____ No <u>X</u>

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0102

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 3% Lat: 37.156930 Long: -88.003221 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0102

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rumex crispus</u>	<u>35</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Chaerophyllum procumbens</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
3. <u>Ambrosia trifida</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
4. <u>Elymus virginicus</u>	<u>75</u>	<u>Yes</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>45</u>	x 3 = <u>135</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>125</u> (A)	<u>295</u> (B)

Prevalence Index = B/A = 2.36

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0102

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/4	90	10YR 4/3	10	C	M	Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0103

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 5% Lat: 37.156478 Long: -88.005225 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0103

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>85</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Phalaris arundinacea</u>	<u>15</u>	<u>No</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>15</u>	x 2 = <u>30</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>85</u>	x 4 = <u>340</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>370</u> (B)
Prevalence Index = B/A = <u>3.70</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0103

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/3	95	5YR 6/8	5	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6)		Indicators for Problematic Hydric Soils³: <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) <input type="checkbox"/> Umbric Surface (F13) <input type="checkbox"/> Red Parent Material (F21)		<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Very Shallow Dark Surface (F22) (Test) <input type="checkbox"/> Other (Explain in Remarks)	
---	--	--	--	--	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes _____ No <u> X </u>
---	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0104

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.156443 Long: -88.009550 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 0 to 2 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0104

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Packera glabella</u>	<u>3</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Rumex crispus</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Euphorbia maculata</u>	<u>3</u>	<u>Yes</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>3</u>	x 1 = <u>3</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>3</u>	x 4 = <u>12</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>11</u> (A)	<u>30</u> (B)

Prevalence Index = B/A = 2.73

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0104

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/4	100					Clay loam	
2-20"	10YR 4/4	97	10YR 4/6	3	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0105
 Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Backslope Local relief (concave, convex, none): convex
 Slope (%): 2% Lat: 37.157609 Long: -88.012532 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0105

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Poa pratensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
2. <u>Schedonorus arundinaceus</u>	<u>45</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Ambrosia trifida</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
4. <u>Packera glabella</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
5. <u>Solidago canadensis</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
6. <u>Cardamine hirsuta</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>3</u>	x 1 = <u>3</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>63</u>	x 4 = <u>252</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>86</u> (A)	<u>315</u> (B)

Prevalence Index = B/A = 3.66

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0105

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/4	100					Clay loam	
2-20"	10YR 4/4	97	10YR 4/6	3	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0106
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Shoulder Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.161035 Long: -88.020712 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0106

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer negundo</u>	<u>3</u>	<u>No</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	<u>x 1 = 0</u>
FACW species <u>13</u>	<u>x 2 = 26</u>
FAC species <u>76</u>	<u>x 3 = 228</u>
FACU species <u>0</u>	<u>x 4 = 0</u>
UPL species <u>0</u>	<u>x 5 = 0</u>
Column Totals: <u>89</u> (A)	<u>254</u> (B)

Prevalence Index = B/A = 2.85

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ambrosia trifida</u>	<u>70</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Carex tribuloides</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. <u>Elymus virginicus</u>	<u>3</u>	<u>No</u>	<u>FACW</u>
4. <u>Rumex crispus</u>	<u>3</u>	<u>No</u>	<u>FAC</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0106

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/3	50					Clay Loam	
0-6"	10YR 3/4	50					Clay Loam	
6-20"	10YR 4/3	97	10YR 4/6	3	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0107
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.162309 Long: -88.021589 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0107

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Tree Stratum</u> (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Herb Stratum</u> (Plot size: <u>5 ft.</u>)			
1.	<u>35</u>	<u>Yes</u>	<u>FAC</u>
2.	<u>10</u>	<u>No</u>	<u>FACW</u>
3.	<u>3</u>	<u>No</u>	<u>FACW</u>
4.	<u>60</u>	<u>Yes</u>	<u>FACU</u>
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>108</u>	= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Woody Vine Stratum</u> (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>13</u>	x 2 = <u>26</u>
FAC species <u>35</u>	x 3 = <u>105</u>
FACU species <u>60</u>	x 4 = <u>240</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>108</u> (A)	<u>371</u> (B)
Prevalence Index = B/A = <u>3.44</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0107

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5"	10YR 4/3	95					Loam	
0-6"	10YR 4/4	5					Loam	
5-20"	10YR 4/3	97	10YR 4/6	3	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0108

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): concave

Slope (%): 2% Lat: 37.162309 Long: -88.021589 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators (minimum of one is required; check all that apply)</p> <p>____ Surface Water (A1) _____ Water-Stained Leaves (B9)</p> <p>____ High Water Table (A2) _____ Aquatic Fauna (B13)</p> <p>____ Saturation (A3) _____ True Aquatic Plants (B14)</p> <p>____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1)</p> <p>____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3)</p> <p>____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4)</p> <p>____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6)</p> <p>____ Iron Deposits (B5) _____ Thin Muck Surface (C7)</p> <p>____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)</p>	<p>Secondary Indicators (minimum of two required)</p> <p>____ Surface Soil Cracks (B6)</p> <p>____ Sparsely Vegetated Concave Surface (B8)</p> <p>____ Drainage Patterns (B10)</p> <p>____ Moss Trim Lines (B16)</p> <p>____ Dry-Season Water Table (C2)</p> <p>____ Crayfish Burrows (C8)</p> <p>____ Saturation Visible on Aerial Imagery (C9)</p> <p>____ Stunted or Stressed Plants (D1)</p> <p>____ Geomorphic Position (D2)</p> <p>____ Shallow Aquitard (D3)</p> <p>____ Microtopographic Relief (D4)</p> <p><u>X</u> FAC-Neutral Test (D5)</p>
<p>Field Observations:</p> <p>Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____</p> <p>Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____</p> <p>Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____</p> <p>(includes capillary fringe)</p>	<p>Wetland Hydrology Present? Yes _____ No <u>X</u> _____</p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION - Use scientific names of plants.

Sampling Point: DP0108

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Tree Stratum</u> (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15 ft.</u>)			
1.	<u>2</u>	<u>No</u>	<u>FACW</u>
2.			
3.			
4.			
5.			
6.			
7.			
	<u>2</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>3</u>	x 1 =	<u>3</u>
FACW species <u>67</u>	x 2 =	<u>134</u>
FAC species <u>15</u>	x 3 =	<u>45</u>
FACU species <u>15</u>	x 4 =	<u>60</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>100</u> (A)		<u>242</u> (B)
Prevalence Index = B/A =		<u>2.42</u>

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Herb Stratum</u> (Plot size: <u>5 ft.</u>)			
1.	<u>65</u>	<u>Yes</u>	<u>FACW</u>
2.	<u>15</u>	<u>No</u>	<u>FAC</u>
3.	<u>5</u>	<u>No</u>	<u>FACU</u>
4.	<u>5</u>	<u>No</u>	<u>FACU</u>
5.	<u>3</u>	<u>No</u>	<u>OBL</u>
6.	<u>3</u>	<u>No</u>	<u>FACU</u>
7.	<u>2</u>	<u>No</u>	<u>FACU</u>
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>98</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Woody Vine Stratum</u> (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0108

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/3	80					Clay Loam	
0-20"	10YR 4/6	20					Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/6/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0109

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): convex

Slope (%): 0% Lat: 37.168450 Long: -88.031553 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		If yes, optional Wetland Site ID: _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			
Remarks: (Explain alternative procedures here or in a separate report.)					

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____	
(includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0109

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Tree Stratum</u> (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>18</u>	x 1 =	<u>18</u>
FACW species <u>0</u>	x 2 =	<u>0</u>
FAC species <u>40</u>	x 3 =	<u>120</u>
FACU species <u>8</u>	x 4 =	<u>32</u>
UPL species <u>10</u>	x 5 =	<u>50</u>
Column Totals: <u>76</u> (A)		<u>220</u> (B)
Prevalence Index = B/A =		<u>2.89</u>

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Herb Stratum</u> (Plot size: <u>5 ft.</u>)			
1.	<u>40</u>	<u>Yes</u>	<u>FAC</u>
2.	<u>10</u>	<u>No</u>	<u>UPL</u>
3.	<u>10</u>	<u>No</u>	<u>OBL</u>
4.	<u>5</u>	<u>No</u>	<u>FACU</u>
5.	<u>5</u>	<u>No</u>	<u>OBL</u>
6.	<u>3</u>	<u>No</u>	<u>OBL</u>
7.	<u>3</u>	<u>No</u>	<u>FACU</u>
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>76</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

	Absolute % Cover	Dominant Species?	Indicator Status
<u>Woody Vine Stratum</u> (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0109

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/4	100					Clay Loam	
4-20"	10YR 4/4	95	7.5YR 4/6	5	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0110

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Backslope Local relief (concave, convex, none): convex

Slope (%): 2% Lat: 37.168989 Long: -88.029539 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0110

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sambucus nigra</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
			<u>5</u> = Total Cover

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>13</u>	x 2 =	<u>26</u>
FAC species <u>55</u>	x 3 =	<u>165</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>20</u>	x 5 =	<u>100</u>
Column Totals: <u>88</u> (A)		<u>291</u> (B)
Prevalence Index = B/A =		<u>3.31</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Verbena urticifolia</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
2. <u>Persicaria lapathifolia</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Setaria faberi</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
4. <u>Panicum virgatum</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>
5. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Brassica nigra</u>	<u>10</u>	<u>Yes</u>	<u>UPL</u>
7. <u>Glycine max</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
8. <u>Elymus virginicus</u>	<u>3</u>	<u>No</u>	<u>FACW</u>
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
			<u>83</u> = Total Cover

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
			_____ = Total Cover

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0110

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 4/3	100					Clay loam	
4-20"	10YR 4/4	95	10yr 4/6	5	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0111

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): _____ Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0111

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sambucus nigra</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	<u>0</u> x 1 = <u>0</u>
FACW species <u>50</u>	<u>2</u> x 2 = <u>100</u>
FAC species <u>45</u>	<u>3</u> x 3 = <u>135</u>
FACU species <u>0</u>	<u>4</u> x 4 = <u>0</u>
UPL species <u>0</u>	<u>5</u> x 5 = <u>0</u>
Column Totals: <u>95</u> (A)	<u>235</u> (B)
Prevalence Index = B/A = <u>2.47</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Elymus virginicus</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Rumex crispus</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Ambrosia trifida</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0111

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5"	10YR 4/4	100					Clay loam	
5-20"	10YR 4/2	95	10YR 5/6	5	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0112

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0112

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rumex crispus</u>	<u>35</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Ambrosia trifida</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>40</u>	x 3 = <u>120</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>40</u> (A)	<u>120</u> (B)
Prevalence Index = B/A = <u>3.00</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0112

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5"	10YR 4/4	100					Clay loam	
5-20"	10YR 4/2	95	10YR 5/6	5	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0113

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		_____ Surface Soil Cracks (B6)
_____ Surface Water (A1)	_____ Water-Stained Leaves (B9)	_____ Sparsely Vegetated Concave Surface (B8)
_____ High Water Table (A2)	_____ Aquatic Fauna (B13)	_____ Drainage Patterns (B10)
_____ Saturation (A3)	_____ True Aquatic Plants (B14)	_____ Moss Trim Lines (B16)
_____ Water Marks (B1)	_____ Hydrogen Sulfide Odor (C1)	_____ Dry-Season Water Table (C2)
_____ Sediment Deposits (B2)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Crayfish Burrows (C8)
_____ Drift Deposits (B3)	_____ Presence of Reduced Iron (C4)	_____ Saturation Visible on Aerial Imagery (C9)
_____ Algal Mat or Crust (B4)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Stunted or Stressed Plants (D1)
_____ Iron Deposits (B5)	_____ Thin Muck Surface (C7)	_____ Geomorphic Position (D2)
_____ Inundation Visible on Aerial Imagery (B7)	_____ Other (Explain in Remarks)	_____ Shallow Aquitard (D3)
		_____ Microtopographic Relief (D4)
		_____ FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0113

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Gleditsia triacanthos</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Celtis laevigata</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>3</u>	x 1 = <u>3</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>40</u>	x 3 = <u>120</u>
FACU species <u>19</u>	x 4 = <u>76</u>
UPL species <u>44</u>	x 5 = <u>220</u>
Column Totals: <u>116</u> (A)	<u>439</u> (B)

Prevalence Index = B/A = 3.78

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lamium purpureum</u>	<u>40</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
3. <u>Cirsium vulgare</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. <u>Solidago canadensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Cardamine hirsuta</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
6. <u>Geranium carolinianum</u>	<u>3</u>	<u>No</u>	<u>UPL</u>
7. <u>Allium canadense</u>	<u>1</u>	<u>No</u>	<u>FACU</u>
8. <u>Lamium amplexicaule</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
9. <u>Packera glabella</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0113

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/4	90	7.5YR 4/6	10	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) <input type="checkbox"/> Umbric Surface (F13) <input type="checkbox"/> Red Parent Material (F21)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Very Shallow Dark Surface (F22) (Test) <input type="checkbox"/> Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0114

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 3% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0114

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Quercus alba</u>	30	Yes	FACU
2. <u>Celtis laevigata</u>	30	Yes	FACW
3. <u>Juglans nigra</u>	25	Yes	FACU
4. <u>Ulmus rubra</u>	25	Yes	FAC
5. <u>Robinia pseudoacacia</u>	15	No	FACU
6. <u>Juniperus virginiana</u>	5	No	FACU
7. _____	_____	_____	_____
_____	130	= Total Cover	_____
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	25	Yes	FACW
2. <u>Ulmus rubra</u>	10	Yes	FAC
3. <u>Symphoricarpos orbiculatus</u>	5	No	FACU
4. <u>Rosa multiflora</u>	5	No	FACU
5. <u>Fraxinus americana</u>	5	No	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
_____	50	= Total Cover	_____
Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Geum canadense</u>	20	Yes	FACU
2. <u>Symphoricarpos orbiculatus</u>	40	Yes	FACU
3. <u>Lamium purpureum</u>	10	No	UPL
4. <u>Carex blanda</u>	10	No	FAC
5. <u>Lonicera japonica</u>	10	No	FAC
6. <u>Galium aparine</u>	5	No	FACU
7. <u>Erigeron philadelphicus</u>	5	No	FACU
8. <u>Toxicodendron radicans</u>	5	No	FAC
9. <u>Cynoglossum virginianum</u>	3	No	UPL
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
_____	108	= Total Cover	_____
Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
_____	_____	= Total Cover	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>55</u>	x 2 = <u>110</u>
FAC species <u>60</u>	x 3 = <u>180</u>
FACU species <u>160</u>	x 4 = <u>640</u>
UPL species <u>13</u>	x 5 = <u>65</u>
Column Totals: <u>288</u> (A)	<u>995</u> (B)
Prevalence Index = B/A = <u>3.45</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0114

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 4/4	100					Clay loam	
4-20"	5YR 4/6	98	10YR 4/4	2	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0115

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 0% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0115

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus rubra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
			= Total Cover
			<u>10</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>70</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
3. <u>Bromus pubescens</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. <u>Solidago canadensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
			= Total Cover
			<u>90</u>

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
			= Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>70</u>	x 1 = <u>70</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>15</u>	x 4 = <u>60</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>175</u> (B)
Prevalence Index = B/A = <u>1.75</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0115

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 3/2	100					Loam	
2-20"	10YR 4/1	97	10YR 5/6	3	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0116

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 20% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0116

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Gleditsia triacanthos</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Prunus serotina</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juniperus virginiana</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>20</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>106</u>	x 4 = <u>424</u>
UPL species <u>8</u>	x 5 = <u>40</u>
Column Totals: <u>129</u> (A)	<u>509</u> (B)
Prevalence Index = B/A = <u>3.95</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lamium purpureum</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
2. <u>Valerianella radiata</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
3. <u>Daucus carota</u>	<u>3</u>	<u>No</u>	<u>UPL</u>
4. <u>Poa pratensis</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
5. <u>Plantago rugelii</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. <u>Schedonorus arundinaceus</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
7. <u>Oxalis stricta</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
8. <u>Trifolium repens</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>99</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	<u>5</u>	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0116

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	5YR 4/6	100					Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydic Soil Indicators:	Indicators for Problematic Hydic Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):	Hydic Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Type: _____ Depth (inches): _____	

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0117
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave
 Slope (%): _____ Lat: _____ Long: _____ Datum: NAD83
 Soil Map Unit Name: Fredonia-Vertrees complex, 12 to 20 percent slopes, eroded, rocky NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)		
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)		
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)		
Field Observations:			
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

VEGETATION - Use scientific names of plants.

Sampling Point: DP0117

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Fraxinus pennsylvanica</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>55</u>	x 2 =	<u>110</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>6</u>	x 4 =	<u>24</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>61</u> (A)		<u>134</u> (B)
Prevalence Index = B/A = <u>2.20</u>		

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Erigeron philadelphicus</u>	<u>3</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Plantago rugelii</u>	<u>3</u>	<u>Yes</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	5Y 5/1	97	10YR 5/6	3	C	M	Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0118

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 3% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Fredonia-Vertrees complex, 12 to 20 percent slopes, eroded, rocky NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0118

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cercis canadensis</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Celtis laevigata</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Quercus alba</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Juniperus virginiana</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Ulmus americana</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 38% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Aralia spinosa</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>10</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>35</u>	x 2 = <u>70</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>85</u>	x 4 = <u>340</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>125</u> (A)	<u>425</u> (B)
Prevalence Index = B/A = <u>3.40</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Osmorhiza longistylis</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Parthenocissus quinquefolia</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Symphoricarpos orbiculatus</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>35</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

 Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0118

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	5Y 5/1	97	10YR 5/6	3	C	M	Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0119
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave
 Slope (%): _____ Lat: _____ Long: _____ Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0119

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Eleocharis palustris</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Cyperus esculentus</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>50</u>	x 1 = <u>50</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>60</u> (A)	<u>70</u> (B)

Prevalence Index = B/A = 1.17

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0119

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/4	100					Silty clay loam	
2-20"	10yr 4/4	95	10yr 5/8	5	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0120

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 3% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0120

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Poa annua</u>	<u>50</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Erigeron philadelphicus</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Plantago major</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. <u>Lamium amplexicaule</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
5. <u>Geranium carolinianum</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
6. <u>Carex blanda</u>	<u>3</u>	<u>No</u>	<u>FAC</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>3</u>	x 3 = <u>9</u>
FACU species <u>75</u>	x 4 = <u>300</u>
UPL species <u>10</u>	x 5 = <u>50</u>
Column Totals: <u>88</u> (A)	<u>359</u> (B)

Prevalence Index = B/A = 4.08

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0120

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 4/4	90	10YR 4/6	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

Indicators for Problematic Hydric Soils³:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0121

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): convex

Slope (%): _____ Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		If yes, optional Wetland Site ID: _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes <u>X</u>	No _____	Depth (inches): <u>1"</u>	Wetland Hydrology Present? Yes <u>X</u> No _____
Water Table Present?	Yes _____	No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____	No <u>X</u>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0121

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Eleocharis palustris</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Cyperus esculentus</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	<u>5</u> x 1 = <u>5</u>
FACW species <u>15</u>	<u>2</u> x 2 = <u>30</u>
FAC species <u>0</u>	<u>3</u> x 3 = <u>0</u>
FACU species <u>0</u>	<u>4</u> x 4 = <u>0</u>
UPL species <u>0</u>	<u>5</u> x 5 = <u>0</u>
Column Totals: <u>20</u> (A)	<u>35</u> (B)

Prevalence Index = B/A = 1.75

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0121

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/4	100					Silty clay loam	
2-20"	10YR 4/4	95	10YR 5/8	5	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0122

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave

Slope (%): 0% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0122

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Eleocharis palustris</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex lurida</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>30</u>	x 1 = <u>30</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>30</u> (A)	<u>30</u> (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0122

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20"	10YR 5/2	90	10YR 5/8	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <u>X</u> No _____
---	---

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0123

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): _____ Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
 Water Table Present? Yes _____ No X Depth (inches): _____
 Saturation Present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0123

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.	<u>80</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>20</u>	<u>No</u>	<u>FACU</u>
3.	<u>3</u>	<u>No</u>	<u>FACU</u>
4.	<u>3</u>	<u>No</u>	<u>UPL</u>
5.	<u>3</u>	<u>No</u>	<u>FACU</u>
6.	<u>1</u>	<u>No</u>	<u>UPL</u>
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>110</u>	= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>106</u>	x 4 = <u>424</u>
UPL species <u>4</u>	x 5 = <u>20</u>
Column Totals: <u>110</u> (A)	<u>444</u> (B)
Prevalence Index = B/A = <u>4.04</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0123

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 3/4	100					Silty clay loam	
2-20"	10YR 3/4	95	10YR 4/6	5	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0124

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 1% Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0124

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphoricarpos orbiculatus</u>	<u>35</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Festuca rubra</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Schedonorus arundinaceus</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
4. <u>Solidago canadensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Valerianella radiata</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Capsella bursa-pastoris</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>120</u>	x 4 = <u>480</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>125</u> (A)	<u>495</u> (B)

Prevalence Index = B/A = 3.96

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0124

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/3	100					Clay Loam	
2-20"	10YR 4/4	100					Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0201
 Investigator(s): Kaitlin Hillier Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.142791 Long: -87.978672 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, ponded (No) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0201

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Gleditsia triacanthos</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Platanus occidentalis</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rosa multiflora</u>	<u>1</u>	<u>No</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>20</u>	x 2 = <u>40</u>
FAC species <u>40</u>	x 3 = <u>120</u>
FACU species <u>1</u>	x 4 = <u>4</u>
UPL species <u>90</u>	x 5 = <u>450</u>
Column Totals: <u>151</u> (A)	<u>614</u> (B)
Prevalence Index = B/A = <u>4.07</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Stellaria media</u>	<u>60</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Lamium purpureum</u>	<u>30</u>	<u>Yes</u>	<u>UPL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0201

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 4/3	97	10YR 4/6	3	C	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0202

Investigator(s): Kaitlin Hillier Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.143168 Long: -87.979006 Datum: NAD83

Soil Map Unit Name: Otwood silt loam, 2 to 6 percent slopes, eroded (OtB2) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Surface Water Present?	Yes <u>X</u> No <u> </u>	Depth (inches):	<u>2"</u>	
Water Table Present?	Yes <u> </u> No <u>X</u>	Depth (inches):	<u> </u>	
Saturation Present?	Yes <u> </u> No <u>X</u>	Depth (inches):	<u> </u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0202

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Populus deltoides</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Acer negundo</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>15</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>75</u>	x 2 =	<u>150</u>
FAC species <u>68</u>	x 3 =	<u>204</u>
FACU species <u>3</u>	x 4 =	<u>12</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>146</u> (A)		<u>366</u> (B)
Prevalence Index = B/A = <u>2.51</u>		

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Solidago gigantea</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Carex blanda</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Elymus virginicus</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
4. <u>Acer negundo</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
5. <u>Lonicera japonica</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Viola sororia</u>	<u>3</u>	<u>No</u>	<u>FAC</u>
7. <u>Geum canadense</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>51</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0202

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 4/3	90	10YR 4/6	10	C	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: /Caldwell Sampling Date: 4/7/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0203
 Investigator(s): Kaitlin Hillier Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.141045 Long: -87.981206 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: PUBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0203

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex stipata</u>	<u>85</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Asclepias incarnata</u>	<u>15</u>	<u>No</u>	<u>OBL</u>
3. <u>Elymus virginicus</u>	<u>15</u>	<u>No</u>	<u>FACW</u>
4. <u>Juncus effusus</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>100</u>	x 1 = <u>100</u>
FACW species <u>25</u>	x 2 = <u>50</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>125</u> (A)	<u>150</u> (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0203

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 4/3	95	10YR 4/6	5	C	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: /Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: _____ Sampling Point: DP0204

Investigator(s): Kaitlin Hillier Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): none

Slope (%): 2% Lat: 37.141132 Long: -87.981166 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: PUBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0204

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Solidago altissima</u>	<u>80</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Poa pratensis</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Cerastium fontanum</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. <u>Vicia grandiflora</u>	<u>3</u>	<u>No</u>	<u>UPL</u>
5. <u>Trifolium repens</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
6. <u>Allium canadense</u>	<u>1</u>	<u>No</u>	<u>FACU</u>
7. <u>Galium tinctorium</u>	<u>1</u>	<u>No</u>	<u>OBL</u>
8. <u>Asclepias syriaca</u>	<u>1</u>	<u>No</u>	<u>FACU</u>
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>1</u>	<u>1</u> x 1 = <u>1</u>
FACW species <u>0</u>	<u>2</u> x 2 = <u>0</u>
FAC species <u>0</u>	<u>3</u> x 3 = <u>0</u>
FACU species <u>120</u>	<u>4</u> x 4 = <u>480</u>
UPL species <u>3</u>	<u>5</u> x 5 = <u>15</u>
Column Totals: <u>124</u> (A)	<u>496</u> (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0204

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/3	97	10YR 4/6	3	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

<p>Hydic Soil Indicators:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) 	<ul style="list-style-type: none"> <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) <input type="checkbox"/> Umbric Surface (F13) <input type="checkbox"/> Red Parent Material (F21) 	<p>Indicators for Problematic Hydic Soils³:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Very Shallow Dark Surface (F22) (Test) <input type="checkbox"/> Other (Explain in Remarks)
--	---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydic Soil Present? Yes _____ No <u> X </u></p>
--	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: /Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0205

Investigator(s): Kaitlin Hillier Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.141988 Long: -87.983073 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: PUBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0205

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Glyceria striata</u>	<u>90</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Persicaria lapathifolia</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Vernonia gigantea</u>	<u>3</u>	<u>No</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>90</u>	x 1 = <u>90</u>
FACW species <u>25</u>	x 2 = <u>50</u>
FAC species <u>3</u>	x 3 = <u>9</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>118</u> (A)	<u>149</u> (B)

Prevalence Index = B/A = 1.26

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/3	85	10YR 4/6	15	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: /Caldwell Sampling Date: 4/7/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0206

Investigator(s): Kaitlin Hillier Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.141958 Long: -87.982976 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: PUBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0206

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix interior</u>	<u>3</u>	<u>No</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
			= Total Cover
			<u>3</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Setaria faberi</u>	<u>75</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Vernonia gigantea</u>	<u>35</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Cirsium vulgare</u>	<u>20</u>	<u>No</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
			= Total Cover
			<u>130</u>

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
			= Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>3</u>	x 2 = <u>6</u>
FAC species <u>35</u>	x 3 = <u>105</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>75</u>	x 5 = <u>375</u>
Column Totals: <u>133</u> (A)	<u>566</u> (B)
Prevalence Index = B/A = <u>4.26</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0206

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/3	90	10YR 4/6	10	C	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> X _____</p>
--	---

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: /Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0207

Investigator(s): Kaitlin Hillier Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.159528 Long: -88.002039 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0207

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Phleum pratense</u>	<u>35</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Poa pratensis</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Rosa multiflora</u>	<u>20</u>	<u>No</u>	<u>FACU</u>
4. <u>Vicia grandiflora</u>	<u>20</u>	<u>No</u>	<u>UPL</u>
5. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Allium canadense</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. <u>Solidago altissima</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
8. <u>Daucus carota</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>93</u>	x 4 = <u>372</u>
UPL species <u>21</u>	x 5 = <u>105</u>
Column Totals: <u>119</u> (A)	<u>492</u> (B)

Prevalence Index = B/A = 4.13

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0207

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/4	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: /Caldwell Sampling Date: 4/8/2020

Applicant/Owner: Geronimo State: KY Sampling Point: DP0208

Investigator(s): Kaitlin Hillier Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): none

Slope (%): 2% Lat: 37.158559 Long: -88.005116 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0208

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Triticum aestivum</u>	<u>65</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Lamium amplexicaule</u>	<u>20</u>	<u>Yes</u>	<u>UPL</u>
3. <u>Stellaria media</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
4. <u>Lamium purpureum</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>87</u>	x 5 = <u>435</u>
Column Totals: <u>87</u> (A)	<u>435</u> (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0208

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/4	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0209
 Investigator(s): Kaitlin Hillier Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): _____ Lat: 37.159464 Long: -88.007009 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0209

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Triticum aestivum</u>	<u>40</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Lamium amplexicaule</u>	<u>15</u>	<u>Yes</u>	<u>UPL</u>
3. <u>Ambrosia trifida</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	<u>0</u> x 1 = <u>0</u>
FACW species <u>0</u>	<u>0</u> x 2 = <u>0</u>
FAC species <u>5</u>	<u>5</u> x 3 = <u>15</u>
FACU species <u>0</u>	<u>0</u> x 4 = <u>0</u>
UPL species <u>55</u>	<u>55</u> x 5 = <u>275</u>
Column Totals: <u>60</u> (A)	<u>290</u> (B)

Prevalence Index = B/A = 4.83

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0209

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/4	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0210
 Investigator(s): Kaitlin Hillier Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.160390 Long: -88.009056 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: PUBHx

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0210

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: 15 ft.)

	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix interior</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
= Total Cover			
	<u>30</u>		

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>75</u>	x 1 = <u>75</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>1</u>	x 3 = <u>3</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>126</u> (A)	<u>178</u> (B)
Prevalence Index = B/A = <u>1.41</u>	

Herb Stratum (Plot size: 5 ft.)

	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex stipata</u>	<u>75</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Alopecurus carolinianus</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. <u>Persicaria pensylvanica</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
4. <u>Rumex crispus</u>	<u>1</u>	<u>No</u>	<u>FAC</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
= Total Cover			
	<u>96</u>		

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: 30 ft.)

	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
= Total Cover			

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0210

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	7.5YR 4/4	80	7.5YR 4/6	20	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 4/8/2020
 Applicant/Owner: Geronimo State: KY Sampling Point: DP0211
 Investigator(s): Kaitlin Hillier Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 2% Lat: 37.160451 Long: -88.009102 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0211

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>45</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>3</u>	<u>3</u> x 1 = <u>3</u>
FACW species <u>45</u>	<u>2</u> x 2 = <u>90</u>
FAC species <u>0</u>	<u>3</u> x 3 = <u>0</u>
FACU species <u>75</u>	<u>4</u> x 4 = <u>300</u>
UPL species <u>6</u>	<u>5</u> x 5 = <u>30</u>
Column Totals: <u>129</u> (A)	<u>423</u> (B)
Prevalence Index = B/A = <u>3.28</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Poa pratensis</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Solidago altissima</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
3. <u>Lamium purpureum</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
4. <u>Carex stipata</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
5. <u>Daucus carota</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP0211

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	10YR 4/3	100					silt loam	
3-16"	7.5YR 4/4	80	7.5YR 4/6	20	C	M	silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1001
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.156187 Long: -87.976640 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1001

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>55</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Amaranthus tuberculatus</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Triticum aestivum</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>15</u>	x 2 = <u>30</u>
FAC species <u>55</u>	x 3 = <u>165</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>5</u>	x 5 = <u>25</u>
Column Totals: <u>75</u> (A)	<u>220</u> (B)

Prevalence Index = B/A = 2.93

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	90	7.5YR 4/6	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> 2 cm Muck (A10)	<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		
<input type="checkbox"/> Sandy Redox (S5)		
<input type="checkbox"/> Stripped Matrix (S6)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1002
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.127941 Long: -87.960330 Datum: NAD83
 Soil Map Unit Name: Lindside silt loam, occasionally flooded (Ld) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1002

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Agrostis gigantea</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Carex vulpinoidea</u>	<u>30</u>	<u>Yes</u>	<u>OBL</u>
4. <u>Juncus tenuis</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
5. <u>Carex molesta</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
6. <u>Carex granularis</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. <u>Vernonia gigantea</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>30</u>	x 1 = <u>30</u>
FACW species <u>35</u>	x 2 = <u>70</u>
FAC species <u>45</u>	x 3 = <u>135</u>
FACU species <u>30</u>	x 4 = <u>120</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>140</u> (A)	<u>355</u> (B)
Prevalence Index = B/A = <u>2.54</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	95	10YR 4/4	5	C	PL	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <u> X </u> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1003

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.126514 Long: -87.960154 Datum: NAD83

Soil Map Unit Name: Lindside silt loam, occasionally flooded (Ld) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1003

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Medicago lupulina</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Trifolium hybridum</u>	<u>25</u>	<u>No</u>	<u>FACU</u>
4. <u>Poa pratensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Erigeron philadelphicus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. <u>Bromus arvensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. <u>Dactylis glomerata</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>150</u>	x 4 = <u>600</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>150</u> (A)	<u>600</u> (B)
Prevalence Index = B/A = <u>4.00</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/3	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1004
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.125512 Long: -87.959744 Datum: NAD83
 Soil Map Unit Name: Lindside silt loam, occasionally flooded (Ld) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1004

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Leersia oryzoides</u>	<u>40</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Glyceria striata</u>	<u>20</u>	<u>No</u>	<u>OBL</u>
4. <u>Impatiens capensis</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. <u>Schedonorus arundinaceus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>110</u>	x 1 = <u>110</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>125</u> (A)	<u>150</u> (B)
Prevalence Index = B/A = <u>1.20</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1004

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	95	10YR 4/4	5	C	PL	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1005

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.125362 Long: -87.953199 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1005

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex frankii</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Eleocharis obtusa</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Ranunculus bulbosus</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
4. <u>Alopecurus carolinianus</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. <u>Bromus arvensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>100</u>	x 1 = <u>100</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>145</u> (A)	<u>230</u> (B)
Prevalence Index = B/A = <u>1.59</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1005

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 4/2	90	10YR 4/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1006
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.124460 Long: -87.955505 Datum: NAD83
 Soil Map Unit Name: Lindsay silt loam, occasionally flooded (Ld) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1006

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>35</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Scirpus atrovirens</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Leersia oryzoides</u>	<u>15</u>	<u>No</u>	<u>OBL</u>
4. <u>Ranunculus bulbosus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>75</u>	<u>x 1 = 75</u>
FACW species <u>0</u>	<u>x 2 = 0</u>
FAC species <u>5</u>	<u>x 3 = 15</u>
FACU species <u>0</u>	<u>x 4 = 0</u>
UPL species <u>0</u>	<u>x 5 = 0</u>
Column Totals: <u>80</u> (A)	<u>90</u> (B)

Prevalence Index = B/A = 1.13

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1006

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1007
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.124194 Long: -87.956311 Datum: NAD83
 Soil Map Unit Name: Lindsay silt loam, occasionally flooded (Ld) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1007

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>90</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Carex mesochorea</u>	<u>20</u>	<u>No</u>	<u>UPL</u>
3. <u>Carex frankii</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
4. <u>Trifolium hybridum</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Juncus tenuis</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
6. <u>Carex vulpinoidea</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>15</u>	x 1 = <u>15</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>100</u>	x 4 = <u>400</u>
UPL species <u>20</u>	x 5 = <u>100</u>
Column Totals: <u>145</u> (A)	<u>545</u> (B)

Prevalence Index = B/A = 3.76

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1007

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/3	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1008

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.122975 Long: -87.957264 Datum: NAD83

Soil Map Unit Name: Lindside silt loam, occasionally flooded (Ld) NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes <u>X</u> No _____	Depth (inches):	<u>2"</u>	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches):	_____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1008

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rosa multiflora</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>60</u>	x 1 = <u>60</u>
FACW species <u>100</u>	x 2 = <u>200</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>10</u>	x 4 = <u>40</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>170</u> (A)	<u>300</u> (B)
Prevalence Index = B/A = <u>1.76</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Impatiens capensis</u>	<u>80</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Scirpus atrovirens</u>	<u>20</u>	<u>No</u>	<u>OBL</u>
3. <u>Glyceria striata</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
4. <u>Carex vulpinoidea</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1008

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1009
 Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.122227 Long: -87.956521 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1009

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Ranunculus bulbosus</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Juncus tenuis</u>	<u>25</u>	<u>No</u>	<u>FAC</u>
4. <u>Dactylis glomerata</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Hordeum pusillum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Plantago rugelii</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>70</u>	x 3 = <u>210</u>
FACU species <u>70</u>	x 4 = <u>280</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>140</u> (A)	<u>490</u> (B)
Prevalence Index = B/A = <u>3.50</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1009

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/4	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):			
Type: _____			
Depth (inches): _____			
		Hydric Soil Present?	Yes _____ No <u>X</u>

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1010
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 1% Lat: 37.122168 Long: -87.956209 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) _____ Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) _____ Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) _____ True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) _____ Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) _____ Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>4"</u> Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1010

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Platanus occidentalis</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>55</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>50</u>	x 1 = <u>50</u>
FACW species <u>40</u>	x 2 = <u>80</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>90</u> (A)	<u>130</u> (B)
Prevalence Index = B/A = <u>1.44</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>15</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Sisyrinchium angustifolium</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Carex frankii</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. <u>Leersia oryzoides</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>35</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1010

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

Indicators for Problematic Hydric Soils³:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1011
 Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 1% Lat: 37.117320 Long: -87.957120 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		If yes, optional Wetland Site ID: _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1011

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus tenuis</u>	<u>75</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Hordeum pusillum</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
3. <u>Schedonorus arundinaceus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>85</u>	x 3 = <u>255</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>90</u> (A)	<u>275</u> (B)

Prevalence Index = B/A = 3.06

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1011

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/6	100					Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1012

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.122789 Long: -87.958592 Datum: NAD83

Soil Map Unit Name: Otwood silt loam, 2 to 6 percent slopes, eroded (OtB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1012

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Carex molesta</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Carex vulpinoidea</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
4. <u>Trifolium repens</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
5. <u>Ranunculus bulbosus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>20</u>	x 1 = <u>20</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>25</u>	x 3 = <u>75</u>
FACU species <u>75</u>	x 4 = <u>300</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>120</u> (A)	<u>395</u> (B)

Prevalence Index = B/A = 3.29

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1012

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/3	95	10YR 4/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1013
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.123122 Long: -87.958539 Datum: NAD83
 Soil Map Unit Name: Otwood silt loam, 2 to 6 percent slopes, eroded (OtB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1013

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex molesta</u>	<u>75</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Carex vulpinoidea</u>	<u>30</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Scirpus atrovirens</u>	<u>15</u>	<u>No</u>	<u>OBL</u>
4. <u>Schedonorus arundinaceus</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>45</u>	x 1 = <u>45</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>75</u>	x 3 = <u>225</u>
FACU species <u>10</u>	x 4 = <u>40</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>130</u> (A)	<u>310</u> (B)
Prevalence Index = B/A = <u>2.38</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1013

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/1	95	10YR 4/6	5	C	M	Silt Loam	
6-16"	10YR 6/3	95	10YR 4/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

<p>Hydric Soil Indicators:</p> <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Black Histic (A3) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> 2 cm Muck (A10) <input checked="" type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Iron-Manganese Masses (F12) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Umbric Surface (F13) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Red Parent Material (F21) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6)	<p>Indicators for Problematic Hydric Soils³:</p> <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Very Shallow Dark Surface (F22) (Test) <input type="checkbox"/> Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1014

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.130430 Long: -87.958235 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 2 to 6 percent slopes, eroded (NhB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1014

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Scirpus atrovirens</u>	<u>75</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex vulpinoidea</u>	<u>20</u>	<u>No</u>	<u>OBL</u>
3. <u>Glyceria striata</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
4. <u>Schedonorus arundinaceus</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>105</u>	x 1 = <u>105</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>10</u>	x 4 = <u>40</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>145</u> (B)

Prevalence Index = B/A = 1.26

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1014

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 6/2	90	10YR 5/6	10	C	M	Silt Loam	
6-18"	10yr 5/6	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1015
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): convex
 Slope (%): 1% Lat: 37.129335 Long: -87.958191 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)		
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)		
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)		
Field Observations:			
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <u>X</u>
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

VEGETATION - Use scientific names of plants.

Sampling Point: DP1015

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	60	Yes	FACU
2. <u>Dactylis glomerata</u>	40	Yes	FACU
3. <u>Trifolium hybridum</u>	40	Yes	FACU
4. <u>Plantago lanceolata</u>	20	No	UPL
5. <u>Poa pratensis</u>	10	No	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>150</u>	x 4 = <u>600</u>
UPL species <u>20</u>	x 5 = <u>100</u>
Column Totals: <u>170</u> (A)	<u>700</u> (B)

Prevalence Index = B/A = 4.12

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1015

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/3	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1016

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.130244 Long: -87.960760 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (Ld) NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1016

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Euthamia graminifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Impatiens capensis</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Onoclea sensibilis</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
5. <u>Scirpus atrovirens</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
6. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>35</u>	x 1 = <u>35</u>
FACW species <u>20</u>	x 2 = <u>40</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>70</u> (A)	<u>120</u> (B)

Prevalence Index = B/A = 1.71

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1016

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	90	10YR 5/6	10	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1017
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): convex
 Slope (%): 1% Lat: 37.130876 Long: -87.961043 Datum: NAD83
 Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1017

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>145</u>	x 4 = <u>580</u>
UPL species <u>5</u>	x 5 = <u>25</u>
Column Totals: <u>150</u> (A)	<u>605</u> (B)
Prevalence Index = B/A = <u>4.03</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>70</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Trifolium hybridum</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Medicago lupulina</u>	<u>20</u>	<u>No</u>	<u>FACU</u>
4. <u>Poa pratensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Plantago rugelii</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. <u>Asclepias tuberosa</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

<u>150</u> = Total Cover			
Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
_____ = Total Cover			

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1017

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/4	100					Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1018

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.137594 Long: -87.960441 Datum: NAD83

Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1018

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ambrosia trifida</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Carex vulpinoidea</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Scirpus atrovirens</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
4. <u>Xanthium strumarium</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
5. <u>Leersia oryzoides</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
6. <u>Lycopus virginicus</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
7. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>60</u>	x 1 = <u>60</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>55</u>	x 3 = <u>165</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>225</u> (B)

Prevalence Index = B/A = 1.96

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1018

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	90	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1019
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 1% Lat: 37.138153 Long: -87.960032 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1019

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ranunculus bulbosus</u>	<u>95</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Solanum carolinense</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
3. <u>Vernonia gigantea</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
4. <u>Bromus hordeaceus</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>100</u>	x 3 = <u>300</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>5</u>	x 5 = <u>25</u>
Column Totals: <u>110</u> (A)	<u>345</u> (B)

Prevalence Index = B/A = 3.14

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1019

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 5/3	100					Silty Clay	
6-18"	10YR 5/4	100					Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1020

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 37.138366 Long: -87.959884 Datum: NAD83

Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1020

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Eleocharis obtusa</u>	50	Yes	OBL
2. <u>Carex vulpinoidea</u>	30	Yes	OBL
3. <u>Leersia oryzoides</u>	20	No	OBL
4. <u>Ranunculus bulbosus</u>	10	No	FAC
5. <u>Hordeum pusillum</u>	5	No	FAC
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>100</u>	x 1 = <u>100</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>145</u> (B)

Prevalence Index = B/A = 1.26

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1020

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	95	10YR 4/4	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1021

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.137069 Long: -87.958609 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded(NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1021

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.	<u>70</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>10</u>	<u>No</u>	<u>FAC</u>
3.	<u>5</u>	<u>No</u>	<u>FACU</u>
4.	<u>5</u>	<u>No</u>	<u>FACW</u>
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>90</u>	= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>5</u>	x 2 = <u>10</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>75</u>	x 4 = <u>300</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>90</u> (A)	<u>340</u> (B)
Prevalence Index = B/A = <u>3.78</u>	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

 Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1021

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/3	95	10YR 5/6	5	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1022
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.135301 Long: -87.959758 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: PUBHh
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes _____ No <u>X</u>	Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____
Water Table Present? Yes <u>X</u> No _____	Depth (inches): <u>surface</u>	
Saturation Present? Yes _____ No <u>X</u>	Depth (inches): _____	
(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants.

Sampling Point: DP1022

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Leersia oryzoides</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex vulpinoidea</u>	<u>30</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Panicum maculosum</u>	<u>25</u>	<u>No</u>	<u>FACW</u>
4. <u>Eleocharis obtusa</u>	<u>20</u>	<u>No</u>	<u>OBL</u>
5. <u>Ranunculus bulbosus</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
6. <u>Juncus tenuis</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>100</u>	x 1 = <u>100</u>
FACW species <u>25</u>	x 2 = <u>50</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>145</u> (A)	<u>210</u> (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1022

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	95	10YR 4/4	5	C	M	Loamy Sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input checked="" type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <u> X </u> No _____
---	---

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1023
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 1% Lat: 37.134842 Long: -87.959206 Datum: NAD83
 Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1023

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>70</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Juncus tenuis</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
3. <u>Andropogon virginicus</u>	<u>20</u>	<u>No</u>	<u>FACU</u>
4. <u>Saponaria officinalis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Bromus arvensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>100</u>	x 4 = <u>400</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>120</u> (A)	<u>460</u> (B)

Prevalence Index = B/A = 3.83

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1023

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/4	100					Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1024

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.133572 Long: -87.957799 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: PUBHh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes <u>X</u> No _____	Depth (inches): <u>surface</u>		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1024

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	<u>80</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Leersia oryzoides</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
3. <u>Juncus tenuis</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>10</u>	x 1 = <u>10</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>200</u> (B)
Prevalence Index = B/A = <u>2.00</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1024

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Sandy Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1025

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.134114 Long: -87.956930 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 2 to 6 percent slopes, eroded (NhB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1025

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	60	Yes	FACU
2. <u>Muhlenbergia schreberi</u>	30	Yes	FAC
3. <u>Juncus tenuis</u>	20	No	FAC
4. <u>Panicum maculosum</u>	10	No	FACW
5. <u>Xanthium strumarium</u>	10	No	FAC
6. <u>Poa pratensis</u>	10	No	FACU
7. <u>Trifolium repens</u>	10	No	FACU
8. <u>Ranunculus bulbosus</u>	5	No	FAC
9. <u>Hordeum pusillum</u>	5	No	FAC
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>70</u>	x 3 = <u>210</u>
FACU species <u>80</u>	x 4 = <u>320</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>160</u> (A)	<u>550</u> (B)

Prevalence Index = B/A = 3.44

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1025

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 5/3	100					silty clay	
4-18"	10YR 5/6	100						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1026
 Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.134681 Long: -87.957963 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1026

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	25	Yes	OBL
2. <u>Carex frankii</u>	20	Yes	OBL
3. <u>Eleocharis obtusa</u>	20	Yes	OBL
4. <u>Scirpus atrovirens</u>	15	No	OBL
5. <u>Leersia oryzoides</u>	10	No	OBL
6. <u>Ranunculus bulbosus</u>	10	No	FAC
7. <u>Persicaria maculosa</u>	10	No	FACW
8. <u>Xanthium strumarium</u>	5	No	FAC
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>90</u>	x 1 = <u>90</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>155</u> (B)

Prevalence Index = B/A = 1.35

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1026

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1027
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.132612 Long: -87.965097 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: PUBHh
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland?	Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____		If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes <u>X</u> No _____		
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1027

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Teucrium canadense</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Persicaria maculosa</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
4. <u>Microstegium vimineum</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
5. <u>Bromus arvensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
6. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result:
OBL species <u>45</u>	x 1 =	<u>45</u>
FACW species <u>25</u>	x 2 =	<u>50</u>
FAC species <u>15</u>	x 3 =	<u>45</u>
FACU species <u>10</u>	x 4 =	<u>40</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>95</u> (A)		<u>180</u> (B)
Prevalence Index = B/A =		<u>1.89</u>

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1027

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	90	10YR 5/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1028
 Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): convex
 Slope (%): 1% Lat: 37.132481 Long: -87.965230 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1028

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Platanus occidentalis</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Gleditsia triacanthos</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Celtis laevigata</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>105</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>90</u>	x 2 =	<u>180</u>
FAC species <u>100</u>	x 3 =	<u>300</u>
FACU species <u>60</u>	x 4 =	<u>240</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>250</u> (A)		<u>720</u> (B)
Prevalence Index = B/A =		<u>2.88</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Chaerophyllum procumbens</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Perilla frutescens</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Erigeron pulchellus</u>	<u>20</u>	<u>No</u>	<u>FACU</u>
4. <u>Phytolacca americana</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Conium maculatum</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>105</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1028

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/3	100					Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1029
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 1% Lat: 37.132141 Long: -87.965962 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1029

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex frankii</u>	<u>30</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex vulpinoidea</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Panicum maculosum</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Xanthium strumarium</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
5. <u>Ranunculus bulbosus</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
6. <u>Ambrosia artemisiifolia</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>50</u>	x 1 = <u>50</u>
FACW species <u>20</u>	x 2 = <u>40</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>95</u> (A)	<u>170</u> (B)
Prevalence Index = B/A = <u>1.79</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1029

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	100					Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1030

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Stream Terrace Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.133193 Long: -87.969500 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		If yes, optional Wetland Site ID: _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1030

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juglans nigra</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Platanus occidentalis</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Celtis laevigata</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	<u>75</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Column	Multiply by:	Result
OBL species	<u>0</u>	x 1 =	<u>0</u>
FACW species	<u>155</u>	x 2 =	<u>310</u>
FAC species	<u>40</u>	x 3 =	<u>120</u>
FACU species	<u>20</u>	x 4 =	<u>80</u>
UPL species	<u>0</u>	x 5 =	<u>0</u>
Column Totals:	<u>215</u> (A)		<u>510</u> (B)
Prevalence Index = B/A =			<u>2.37</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Microstegium vimineum</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Poa sylvestris</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Elymus virginicus</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Impatiens capensis</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____ = Total Cover	

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1030

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/3	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1031

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 1% Lat: 37.135026 Long: -87.967797 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1031

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>70</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Platanus occidentalis</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Ulmus americana</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
			<u>100</u> = Total Cover

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	<u>0</u> x 1 = <u>0</u>
FACW species <u>30</u>	<u>30</u> x 2 = <u>60</u>
FAC species <u>71</u>	<u>71</u> x 3 = <u>213</u>
FACU species <u>0</u>	<u>0</u> x 4 = <u>0</u>
UPL species <u>3</u>	<u>3</u> x 5 = <u>15</u>
Column Totals: <u>104</u> (A)	<u>288</u> (B)
Prevalence Index = B/A = <u>2.77</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Euonymus fortunei</u>	<u>3</u>	<u>No</u>	<u>UPL</u>
2. <u>Ranunculus bulbosus</u>	<u>1</u>	<u>No</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
			<u>4</u> = Total Cover

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
			_____ = Total Cover

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1031

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/3	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1032

Investigator(s): Ben Hess Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.135868 Long: -87.965405 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: PUBF

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1032

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>70</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Acer rubrum</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Diospyros virginiana</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
3. <u>Sambucus nigra</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>90</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>120</u>	x 1 = <u>120</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>36</u>	x 3 = <u>108</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>3</u>	x 5 = <u>15</u>
Column Totals: <u>159</u> (A)	<u>243</u> (B)
Prevalence Index = B/A = <u>1.53</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Euonymus fortunei</u>	<u>3</u>	<u>No</u>	<u>UPL</u>
2. <u>Ranunculus bulbosus</u>	<u>1</u>	<u>No</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>4</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1032

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1033
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.139006 Long: -87.964508 Datum: NAD83
 Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1033

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1. <u>Salix nigra</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1. <u>Acer rubrum</u>	<u>100</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>100</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>25</u>	x 1 = <u>25</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>125</u>	x 3 = <u>375</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>150</u> (A)	<u>400</u> (B)
Prevalence Index = B/A = <u>2.67</u>	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1. <u>Acer rubrum</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Glyceria striata</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>30</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1033

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 6/1	90	10YR 4/6	10	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1034
 Investigator(s): Ben Hess Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Stream Terrace Local relief (concave, convex, none): none
 Slope (%): 1% Lat: 37.139868 Long: -87.962927 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1034

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphoricarpos orbiculatus</u>	<u>70</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Lonicera japonica</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
3. <u>Toxicodendron radicans</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
4. <u>Carex rosea</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Galium aparine</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. <u>Rubus allegheniensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>85</u>	x 4 = <u>340</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>430</u> (B)

Prevalence Index = B/A = 3.74

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1034

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/3	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1101

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Toeslope _____ Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.131221 Long: -87.986779 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: PUBHh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1101

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Bidens frondosa</u>	35	Yes	FACW
2. <u>Scirpus atrovirens</u>	20	Yes	OBL
3. <u>Leersia oryzoides</u>	15	No	OBL
4. <u>Microstegium vimineum</u>	5	No	FAC
5. <u>Ludwigia alternifolia</u>	3	No	FACW
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>35</u>	x 1 = <u>35</u>
FACW species <u>38</u>	x 2 = <u>76</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>78</u> (A)	<u>126</u> (B)

Prevalence Index = B/A = 1.62

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1101

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test) <input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Black Histic (A3)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Redox Dark Surface (F6)	<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> 2 cm Muck (A10)	<input checked="" type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Iron-Manganese Masses (F12)	<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Umbric Surface (F13)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Red Parent Material (F21)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			
<input type="checkbox"/> Sandy Redox (S5)			
<input type="checkbox"/> Stripped Matrix (S6)			

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1102

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 3% Lat: 37.131258 Long: -87.986894 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1102

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Solidago canadensis</u>	<u>80</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Poa pratensis</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
3. <u>Mentha arvensis</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
4. <u>Carex vulpinoidea</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
5. <u>Parthenocissus quinquefolia</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	<u>5</u> x 1 = <u>5</u>
FACW species <u>10</u>	<u>20</u> x 2 = <u>20</u>
FAC species <u>0</u>	<u>0</u> x 3 = <u>0</u>
FACU species <u>100</u>	<u>400</u> x 4 = <u>400</u>
UPL species <u>0</u>	<u>0</u> x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>425</u> (B)

Prevalence Index = B/A = 3.70

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1102

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					Clay Loam	
2-16"	10yr 4/4	100					Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1103
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.131634 Long: -87.986909 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland?	Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____		If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes <u>X</u> No _____		
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1103

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>80</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Scirpus atrovirens</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
3. <u>Poa pratensis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
4. <u>Ludwigia alternifolia</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>85</u>	<u>x 1 = 85</u>
FACW species <u>5</u>	<u>x 2 = 10</u>
FAC species <u>0</u>	<u>x 3 = 0</u>
FACU species <u>5</u>	<u>x 4 = 20</u>
UPL species <u>0</u>	<u>x 5 = 0</u>
Column Totals: <u>95</u> (A)	<u>115</u> (B)

Prevalence Index = B/A = 1.21

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1103

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1104
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Toeslope _____ Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.131349 Long: -87.988677 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: PUBHh
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1104

		Absolute	Dominant	Indicator
		% Cover	Species?	Status
Tree Stratum (Plot size: <u>30 ft.</u>)				
1.	<u>Salix nigra</u>	<u>80</u>	<u>Yes</u>	<u>OBL</u>
2.	<u>Fraxinus pennsylvanica</u>	<u>15</u>	<u>No</u>	<u>FACW</u>
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
		<u>95</u>	= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)				
1.	<u>Ulmus rubra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
		<u>10</u>	= Total Cover	
Herb Stratum (Plot size: <u>5 ft.</u>)				
1.	<u>Persicaria hydropiper</u>	<u>60</u>	<u>Yes</u>	<u>OBL</u>
2.	<u>Microstegium vimineum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
11.	_____	_____	_____	_____
12.	_____	_____	_____	_____
13.	_____	_____	_____	_____
14.	_____	_____	_____	_____
15.	_____	_____	_____	_____
16.	_____	_____	_____	_____
17.	_____	_____	_____	_____
18.	_____	_____	_____	_____
19.	_____	_____	_____	_____
20.	_____	_____	_____	_____
		<u>75</u>	= Total Cover	
Woody Vine Stratum (Plot size: <u>30 ft.</u>)				
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
		_____	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>140</u>	x 1 =	<u>140</u>
FACW species <u>15</u>	x 2 =	<u>30</u>
FAC species <u>25</u>	x 3 =	<u>75</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>180</u> (A)		<u>245</u> (B)
Prevalence Index = B/A =		<u>1.36</u>

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1104

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1105

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 3% Lat: 37.131356 Long: -87.988777 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1105

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1. <u>Juglans nigra</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>80</u>	x 3 = <u>240</u>
FACU species <u>40</u>	x 4 = <u>160</u>
UPL species <u>5</u>	x 5 = <u>25</u>
Column Totals: <u>130</u> (A)	<u>430</u> (B)
Prevalence Index = B/A = <u>3.31</u>	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1. <u>Microstegium vimineum</u>	<u>80</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Lonicera maackii</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
3. <u>Persicaria hydropiper</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

 Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1105

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					Clay Loam	
2-16"	10YR 4/4	100					Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> _____</p>
--	---

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1106
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.132305 Long: -87.991517 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1106

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sambucus nigra</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
		<u>5</u>	= Total Cover

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>40</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Scirpus pendulus</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Poa pratensis</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Carex hystericina</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
5. <u>Teucrium canadense</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
6. <u>Ludwigia alternifolia</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. <u>Microstegium vimineum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
8. <u>Platanus occidentalis</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
9. <u>Salix nigra</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
10. <u>Boehmeria cylindrica</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
		<u>120</u>	= Total Cover

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>75</u>	x 1 =	<u>75</u>
FACW species <u>20</u>	x 2 =	<u>40</u>
FAC species <u>10</u>	x 3 =	<u>30</u>
FACU species <u>20</u>	x 4 =	<u>80</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>125</u> (A)		<u>225</u> (B)
Prevalence Index = B/A =		<u>1.80</u>

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1106

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	10YR 4/3	90	10YR 4/6	10	C	M	Clay Loam	
3-16"	10YR 4/4	90	5YR 5/8	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1107
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.132408 Long: -87.991556 Datum: NAD83
 Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1107

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Schedonorus arundinaceus</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Festuca rubra</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Sambucus nigra</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
4. <u>Allium canadense</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Calystegia sepium</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>70</u>	x 4 = <u>280</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>370</u> (B)

Prevalence Index = B/A = 3.70

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1107

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 4/4	95	10YR 4/6	5	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1108

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.134228 Long: -87.992585 Datum: NAD83

Soil Map Unit Name: Otwood silt loam, 2 to 6 percent slopes, eroded (OtB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1108

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>85</u>	x 4 = <u>340</u>
UPL species <u>43</u>	x 5 = <u>215</u>
Column Totals: <u>148</u> (A)	<u>605</u> (B)
Prevalence Index = B/A = <u>4.09</u>	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.	<u>40</u>	<u>Yes</u>	<u>UPL</u>
2.	<u>40</u>	<u>Yes</u>	<u>FACU</u>
3.	<u>30</u>	<u>Yes</u>	<u>FACU</u>
4.	<u>15</u>	<u>No</u>	<u>FACU</u>
5.	<u>10</u>	<u>No</u>	<u>FAC</u>
6.	<u>10</u>	<u>No</u>	<u>FACW</u>
7.	<u>3</u>	<u>No</u>	<u>UPL</u>
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>148</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

 Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1108

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/4	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1109

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.134268 Long: -87.992825 Datum: NAD83

Soil Map Unit Name: Otwood silt loam, 2 to 6 percent slopes, eroded (OtB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes <u>X</u> No _____	Depth (inches): <u>4"</u>		
Saturation Present?	Yes <u>X</u> No _____	Depth (inches): <u>surface</u>		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1109

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Scirpus pendulus</u>	<u>70</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex tribuloides</u>	<u>20</u>	<u>No</u>	<u>FACW</u>
3. <u>Juncus tenuis</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
4. <u>Carex vulpinoidea</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
5. <u>Hypericum mutilum</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
6. <u>Eleocharis obtusa</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>80</u>	x 1 = <u>80</u>
FACW species <u>25</u>	x 2 = <u>50</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>115</u> (A)	<u>160</u> (B)
Prevalence Index = B/A = <u>1.39</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1109

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1110

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.133879 Long: -87.990793 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: PUBHh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes <u>X</u> No _____	Depth (inches): <u>4"</u>		
Saturation Present?	Yes <u>X</u> No _____	Depth (inches): <u>surface</u>		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1110

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Scirpus atrovirens</u>	<u>60</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex tribuloides</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Carex vulpinoidea</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. <u>Eleocharis obtusa</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>70</u>	x 1 = <u>70</u>
FACW species <u>30</u>	x 2 = <u>60</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>130</u> (B)

Prevalence Index = B/A = 1.30

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1110

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6)		<input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input checked="" type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) <input type="checkbox"/> Umbric Surface (F13) <input type="checkbox"/> Red Parent Material (F21)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) (MLRA 147) <input type="checkbox"/> Very Shallow Dark Surface (F22) (Test) <input type="checkbox"/> Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1111
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.133895 Long: -87.990746 Datum: NAD83
 Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> _____ Surface Water (A1) _____ Water-Stained Leaves (B9) _____ High Water Table (A2) _____ Aquatic Fauna (B13) _____ Saturation (A3) _____ True Aquatic Plants (B14) _____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) _____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4) _____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Iron Deposits (B5) _____ Thin Muck Surface (C7) _____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION - Use scientific names of plants.

Sampling Point: DP1111

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across All Strata 2 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>75</u>	x 4 = <u>300</u>
UPL species <u>10</u>	x 5 = <u>50</u>
Column Totals: <u>100</u> (A)	<u>395</u> (B)
Prevalence Index = B/A = <u>3.95</u>	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	<u>100</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation
 Dominance Test is >50%
 Prevalence Index is ≤ 3.0¹
 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1111

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

Indicators for Problematic Hydric Soils³:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1112

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Toeslope _____ Local relief (concave, convex, none): concave

Slope (%): 3% Lat: 37.132232 Long: -87.988361 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1112

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex tribuloides</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Carex vulpinoidea</u>	<u>30</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Panicum hydropiper</u>	<u>20</u>	<u>No</u>	<u>OBL</u>
4. <u>Microstegium vimineum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
5. <u>Festuca rubra</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. <u>Leersia oryzoides</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
		<u>113</u>	= Total Cover

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>53</u>	x 1 = <u>53</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>113</u> (A)	<u>188</u> (B)
Prevalence Index = B/A = <u>1.66</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1112

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/4	100					Clay Loam	
2-16"	10YR 4/3	80	5YR 5/8	20	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1113

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.132455 Long: -87.977569 Datum: NAD83

Soil Map Unit Name: Lindside silt loam, occasionally flooded (Ld) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1113

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carya ovata</u>	40	Yes	FACU
2. <u>Celtis laevigata</u>	25	Yes	FACW
3. <u>Quercus palustris</u>	20	No	FACW
4. <u>Carya cordiformis</u>	20	No	FACU
5. <u>Liquidambar styraciflua</u>	10	No	FAC
6. _____	_____	_____	_____
7. _____	_____	_____	_____
115		= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cercis canadensis</u>	30	Yes	FACU
2. <u>Ulmus rubra</u>	30	Yes	FAC
3. <u>Symphoricarpos orbiculatus</u>	30	Yes	FACU
4. <u>Fraxinus quadrangulata</u>	20	No	UPL
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
110		= Total Cover	
Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Solidago altissima</u>	40	Yes	FACU
2. <u>Elymus canadensis</u>	30	Yes	FACU
3. <u>Microstegium vimineum</u>	10	No	FAC
4. <u>Poa pratensis</u>	10	No	FACU
5. <u>Impatiens capensis</u>	5	No	FACW
6. <u>Elymus villosus</u>	5	No	FACU
7. <u>Carex davisi</u>	5	No	FAC
8. <u>Verbesina alternifolia</u>	5	No	FAC
9. <u>Cryptotaenia canadensis</u>	3	No	FAC
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
113		= Total Cover	
Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
_____		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 29% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>63</u>	x 3 = <u>189</u>
FACU species <u>205</u>	x 4 = <u>820</u>
UPL species <u>20</u>	x 5 = <u>100</u>
Column Totals: <u>338</u> (A)	<u>1209</u> (B)
Prevalence Index = B/A = <u>3.58</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1113

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/4	100					Silty Clay Loam	
2-16"	10yr 4/4	95	10YR 4/6	5	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1114
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____
 Slope (%): 5% Lat: 37.136418 Long: -87.980506 Datum: NAD83
 Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: R4SBC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1114

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.	60	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	60	= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>60</u>	x 5 = <u>300</u>
Column Totals: <u>60</u> (A)	<u>300</u> (B)
Prevalence Index = B/A = <u>5.00</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1114

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 4/2	90	10YR 4/4	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1115

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.135329 Long: -87.983558 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 2 to 6 percent slopes, eroded (NhB2) NWI classification: PUBHh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1115

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Glyceria striata</u>	30	Yes	OBL
2. <u>Typha X glauca</u>	20	Yes	OBL
3. <u>Leersia oryzoides</u>	15	No	OBL
4. <u>Scirpus atrovirens</u>	10	No	OBL
5. <u>Juncus effusus</u>	5	No	FACW
6. <u>Boehmeria cylindrica</u>	3	No	FACW
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>75</u>	x 1 = <u>75</u>
FACW species <u>8</u>	x 2 = <u>16</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>83</u> (A)	<u>91</u> (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1115

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/2	95	10YR 5/6	5	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):	
Type: _____	
Depth (inches): _____	
	Hydric Soil Present? Yes <u>X</u> No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1116

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.135381 Long: -87.983602 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 2 to 6 percent slopes, eroded (NhB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1116

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Triticum aestivum</u>	<u>50</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Solidago altissima</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Bromus arvensis</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
4. <u>Apocynum cannabinum</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Packera glabella</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
6. <u>Erigeron canadensis</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>48</u>	x 4 = <u>192</u>
UPL species <u>50</u>	x 5 = <u>250</u>
Column Totals: <u>103</u> (A)	<u>447</u> (B)

Prevalence Index = B/A = 4.34

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1116

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					Clay Loam	
2-16"	10YR 4/4	95	10YR 4/6	5	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1117

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Toeslope _____ Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.135553 Long: -87.983170 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1117

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>70</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sambucus nigra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Fraxinus pennsylvanica</u>	<u>4</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>14</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>84</u>	x 1 =	<u>84</u>
FACW species <u>89</u>	x 2 =	<u>178</u>
FAC species <u>10</u>	x 3 =	<u>30</u>
FACU species <u>15</u>	x 4 =	<u>60</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>198</u> (A)		<u>352</u> (B)
Prevalence Index = B/A =		<u>1.78</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Impatiens capensis</u>	<u>80</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Bromus arvensis</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
3. <u>Leersia oryzoides</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. <u>Juncus effusus</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
5. <u>Carex frankii</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
6. <u>Carex hystericina</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
7. <u>Galium tinctorium</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>114</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1117

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1118

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.133587 Long: -87.982296 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1118

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>70</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sambucus nigra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>110</u>	x 1 = <u>110</u>
FACW species <u>65</u>	x 2 = <u>130</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>185</u> (A)	<u>270</u> (B)
Prevalence Index = B/A = <u>1.46</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Impatiens capensis</u>	<u>60</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Glyceria striata</u>	<u>20</u>	<u>No</u>	<u>OBL</u>
3. <u>Leersia oryzoides</u>	<u>15</u>	<u>No</u>	<u>OBL</u>
4. <u>Juncus effusus</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
5. <u>Carex vulpinoidea</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1118

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/1	90	10YR 5/6	10	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1119

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Toeslope _____ Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.132109 Long: -87.982349 Datum: NAD83

Soil Map Unit Name: cxfran 50 eleobt 50 ranbul 30 brojap 5 alocar 10 (NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1119

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus rubra</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Quercus alba</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus rubra</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>15</u>	x 1 = <u>15</u>
FACW species <u>5</u>	x 2 = <u>10</u>
FAC species <u>50</u>	x 3 = <u>150</u>
FACU species <u>30</u>	x 4 = <u>120</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>295</u> (B)
Prevalence Index = B/A = <u>2.95</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Glyceria striata</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Impatiens capensis</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Scirpus atrovirens</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
4. <u>Toxicodendron radicans</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____ = Total Cover	

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1119

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 4/4	100					Silt Loam	
4-16"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1120

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____

Slope (%): 3% Lat: 37.132132 Long: -87.982316 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u>
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1120

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer saccharum</u>	<u>80</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Quercus rubra</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Carya laciniosa</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphoricarpos orbiculatus</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>185</u>	x 4 = <u>740</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>220</u> (A)	<u>835</u> (B)
Prevalence Index = B/A = <u>3.80</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Podophyllum peltatum</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Sanicula odorata</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
3. <u>Galium tinctorium</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1120

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					Silty Clay Loam	
2-16"	10YR 4/4	100					Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1121

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.139557 Long: -87.973147 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: PUBHx

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1121

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>25</u>	x 1 =	<u>25</u>
FACW species <u>15</u>	x 2 =	<u>30</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>40</u> (A)		<u>55</u> (B)
Prevalence Index = B/A = <u>1.38</u>		

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex vulpinoidea</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Carex tribuloides</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Leersia oryzoides</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. <u>Panicum capillare</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1121

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1"	10YR 4/4	100					Clay loam	
1-16"	10YR 5/2	90	10YR 4/6	10	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1122

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____

Slope (%): 2% Lat: 37.139474 Long: -87.973193 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1122

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Triticum aestivum</u>	<u>50</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Solidago altissima</u>	<u>50</u>	<u>Yes</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>50</u>	x 4 = <u>200</u>
UPL species <u>50</u>	x 5 = <u>250</u>
Column Totals: <u>100</u> (A)	<u>450</u> (B)

Prevalence Index = B/A = 4.50

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1122

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	10YR 4/4	100					Clay loam	
3-16"	10YR 4/3	70	10YR 4/4	30	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1123

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): _____

Slope (%): 0% Lat: 37.138264 Long: -87.973124 Datum: NAD83

Soil Map Unit Name: Crider-Baxter complex, 12 to 30 percent slopes, severely eroded (CtE3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1123

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>100</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Acer negundo</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>80</u>	x 1 =	<u>80</u>
FACW species <u>115</u>	x 2 =	<u>230</u>
FAC species <u>35</u>	x 3 =	<u>105</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>230</u> (A)		<u>415</u> (B)
Prevalence Index = B/A =		<u>1.80</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Persicaria hydropiper</u>	<u>80</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Laportea canadensis</u>	<u>15</u>	<u>No</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					Silt Loam	
2-16"	10YR 4/4	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1124

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____

Slope (%): 0% Lat: 37.135570 Long: -87.972477 Datum: NAD83

Soil Map Unit Name: Elk silt loam, 1 to 4 percent slopes, rarely flooded (EkB) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1124

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus rubra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juglans nigra</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>3</u>	x 1 = <u>3</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>51</u>	x 4 = <u>204</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>164</u> (A)	<u>457</u> (B)
Prevalence Index = B/A = <u>2.79</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Teucrium canadense</u>	<u>80</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Asclepias syriaca</u>	<u>20</u>	<u>No</u>	<u>FACU</u>
3. <u>Rubus allegheniensis</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
4. <u>Verbena alternifolia</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
5. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Ambrosia trifida</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
7. <u>Bromus arvensis</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
8. <u>Galium aparine</u>	<u>3</u>	<u>No</u>	<u>FACU</u>
9. <u>Persicaria hydropiper</u>	<u>3</u>	<u>No</u>	<u>OBL</u>
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1125
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____
 Slope (%): 0% Lat: 37.133867 Long: -87.972061 Datum: NAD83
 Soil Map Unit Name: Elk silt loam, 1 to 4 percent slopes, rarely flooded (Ekb) NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1125

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juglans nigra</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Gleditsia triacanthos</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Juglans nigra</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Celtis laevigata</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Ulmus rubra</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>30</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>25</u>	x 2 =	<u>50</u>
FAC species <u>40</u>	x 3 =	<u>120</u>
FACU species <u>115</u>	x 4 =	<u>460</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>180</u> (A)		<u>630</u> (B)
Prevalence Index = B/A =		<u>3.50</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Bromus arvensis</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Solidago altissima</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Teucrium canadense</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Asclepias syriaca</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
5. <u>Chaerophyllum tainturieri</u>	<u>15</u>	<u>No</u>	<u>FAC</u>
6. <u>Verbesina alternifolia</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>135</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

 Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1126

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____

Slope (%): 0% Lat: 37.131844 Long: -87.973218 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 6 to 12 percent slopes, severely eroded (NhC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1126

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	70	Yes	FACW
2. <u>Liquidambar styraciflua</u>	20	Yes	FAC
3. <u>Celtis laevigata</u>	10	No	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	20	Yes	FACW
2. <u>Symphoricarpos orbiculatus</u>	10	Yes	FACU
3. <u>Fraxinus americana</u>	5	No	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	35	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>10</u>	x 1 =	<u>10</u>
FACW species <u>145</u>	x 2 =	<u>290</u>
FAC species <u>50</u>	x 3 =	<u>150</u>
FACU species <u>55</u>	x 4 =	<u>220</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>260</u> (A)		<u>670</u> (B)
Prevalence Index = B/A =		<u>2.58</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Impatiens capensis</u>	40	Yes	FACW
2. <u>Microstegium vimineum</u>	20	Yes	FAC
3. <u>Parthenocissus quinquefolia</u>	15	Yes	FACU
4. <u>Ageratina altissima</u>	10	No	FACU
5. <u>Carex davisii</u>	10	No	FAC
6. <u>Rosa palustris</u>	10	No	OBL
7. <u>Sanicula odorata</u>	10	No	FACU
8. <u>Erigeron pulchellus</u>	5	No	FACU
9. <u>Persicaria pensylvanica</u>	5	No	FACW
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	125	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1126

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					silty clay loam	
2-16"	10YR 4/4	100					silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1127

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.139996 Long: -87.968315 Datum: NAD83

Soil Map Unit Name: Melvin silt loam, occasionally flooded (Me) NWI classification: PFO1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u>_____</u> Surface Water (A1)	<u>_____</u> Water-Stained Leaves (B9)	<u>_____</u> Sparsely Vegetated Concave Surface (B8)
<u>_____</u> High Water Table (A2)	<u>_____</u> Aquatic Fauna (B13)	<u>_____</u> Drainage Patterns (B10)
<u>_____</u> Saturation (A3)	<u>_____</u> True Aquatic Plants (B14)	<u>_____</u> Moss Trim Lines (B16)
<u>_____</u> Water Marks (B1)	<u>_____</u> Hydrogen Sulfide Odor (C1)	<u>_____</u> Dry-Season Water Table (C2)
<u>_____</u> Sediment Deposits (B2)	<u>_____</u> Oxidized Rhizospheres on Living Roots (C3)	<u>_____</u> Crayfish Burrows (C8)
<u>_____</u> Drift Deposits (B3)	<u>_____</u> Presence of Reduced Iron (C4)	<u>_____</u> Saturation Visible on Aerial Imagery (C9)
<u>X</u> Algal Mat or Crust (B4)	<u>_____</u> Recent Iron Reduction in Tilled Soils (C6)	<u>_____</u> Stunted or Stressed Plants (D1)
<u>_____</u> Iron Deposits (B5)	<u>_____</u> Thin Muck Surface (C7)	<u>X</u> Geomorphic Position (D2)
<u>_____</u> Inundation Visible on Aerial Imagery (B7)	<u>_____</u> Other (Explain in Remarks)	<u>_____</u> Shallow Aquitard (D3)
		<u>_____</u> Microtopographic Relief (D4)
		<u>X</u> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1127

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>80</u>	<u>x 1 = 80</u>
FACW species <u>10</u>	<u>x 2 = 20</u>
FAC species <u>0</u>	<u>x 3 = 0</u>
FACU species <u>0</u>	<u>x 4 = 0</u>
UPL species <u>0</u>	<u>x 5 = 0</u>
Column Totals: <u>90</u> (A)	<u>100</u> (B)

Prevalence Index = B/A = 1.11

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Leersia oryzoides</u>	<u>40</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Scirpus pendulus</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Carex lurida</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
4. <u>Juncus effusus</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
5. <u>Carex typhina</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1127

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1"	10YR 4/3	100					Silty Clay Loam	
1-16"	10yr 5/2	80	10YR 5/6	20	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1128

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): _____

Slope (%): 0% Lat: 37.139910 Long: -87.970130 Datum: NAD83

Soil Map Unit Name: Melvin silt loam, occasionally flooded (Me) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1128

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

	Absolute % Cover	Dominant Species?	Indicator Status
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Herb Stratum (Plot size: <u>5 ft.</u>)			
1.	60	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	60	= Total Cover	

	Absolute % Cover	Dominant Species?	Indicator Status
Woody Vine Stratum (Plot size: <u>30 ft.</u>)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>60</u>	x 5 = <u>300</u>
Column Totals: <u>60</u> (A)	<u>300</u> (B)
Prevalence Index = B/A = <u>5.00</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1128

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"	10YR 4/2	100					silty clay loam	
2-16"	10yr 4/4	100					silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		
<input type="checkbox"/> Sandy Redox (S5)		
<input type="checkbox"/> Stripped Matrix (S6)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):		Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
Type: _____	Depth (inches): _____	

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1129

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.140783 Long: -87.966846 Datum: NAD83

Soil Map Unit Name: Nicholson silt loam, 2 to 6 percent slopes, eroded (NhB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u>_____</u> Surface Water (A1)	<u>_____</u> Water-Stained Leaves (B9)	<u>_____</u> Sparsely Vegetated Concave Surface (B8)
<u>_____</u> High Water Table (A2)	<u>_____</u> Aquatic Fauna (B13)	<u>_____</u> Drainage Patterns (B10)
<u>_____</u> Saturation (A3)	<u>_____</u> True Aquatic Plants (B14)	<u>_____</u> Moss Trim Lines (B16)
<u>_____</u> Water Marks (B1)	<u>_____</u> Hydrogen Sulfide Odor (C1)	<u>_____</u> Dry-Season Water Table (C2)
<u>_____</u> Sediment Deposits (B2)	<u>_____</u> Oxidized Rhizospheres on Living Roots (C3)	<u>_____</u> Crayfish Burrows (C8)
<u>_____</u> Drift Deposits (B3)	<u>_____</u> Presence of Reduced Iron (C4)	<u>_____</u> Saturation Visible on Aerial Imagery (C9)
<u>X</u> Algal Mat or Crust (B4)	<u>_____</u> Recent Iron Reduction in Tilled Soils (C6)	<u>_____</u> Stunted or Stressed Plants (D1)
<u>_____</u> Iron Deposits (B5)	<u>_____</u> Thin Muck Surface (C7)	<u>X</u> Geomorphic Position (D2)
<u>_____</u> Inundation Visible on Aerial Imagery (B7)	<u>_____</u> Other (Explain in Remarks)	<u>_____</u> Shallow Aquitard (D3)
		<u>_____</u> Microtopographic Relief (D4)
		<u>X</u> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1129

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>60</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	<u>15</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Leersia oryzoides</u>	<u>25</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Platanus occidentalis</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>100</u>	x 1 =	<u>100</u>
FACW species <u>5</u>	x 2 =	<u>10</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>105</u> (A)		<u>110</u> (B)
Prevalence Index = B/A =		<u>1.05</u>

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1129

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1"	10YR 4/3	100					Silty Clay Loam	
1-16"	10YR 5/2	80	10YR 5/6	20	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1130

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.143881 Long: -87.973178 Datum: NAD83

Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1130

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	25	Yes	FAC
2. <u>Panicum hydropiper</u>	25	Yes	OBL
3. <u>Carex tribuloides</u>	15	Yes	FACW
4. <u>Carex vulpinoidea</u>	15	Yes	OBL
5. <u>Ambrosia artemisiifolia</u>	15	Yes	FACU
6. <u>Juncus tenuis</u>	15	Yes	FAC
7. <u>Leersia oryzoides</u>	10	No	OBL
8. <u>Gratiola virginiana</u>	10	No	OBL
9. <u>Eleocharis obtusa</u>	10	No	OBL
10. <u>Scirpus pendulus</u>	5	No	OBL
11. <u>Asclepias incarnata</u>	5	No	OBL
12. <u>Sium suave</u>	5	No	OBL
13. <u>Juncus effusus</u>	3	No	FACW
14. <u>Xanthium strumarium</u>	3	No	FAC
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
		161	= Total Cover

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>85</u>	x 1 = <u>85</u>
FACW species <u>18</u>	x 2 = <u>36</u>
FAC species <u>43</u>	x 3 = <u>129</u>
FACU species <u>15</u>	x 4 = <u>60</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>161</u> (A)	<u>310</u> (B)
Prevalence Index = B/A = <u>1.93</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1130

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/1	95	10YR 5/6	5	c	m	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1131

Investigator(s): Crystal Renskers Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.143870 Long: -87.973265 Datum: NAD83

Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1131

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Triticum aestivum</u>	<u>70</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Echinochloa crus-galli</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
3. <u>Ambrosia artemisiifolia</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
4. <u>Acalypha rhomboidea</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>70</u>	x 5 = <u>350</u>
Column Totals: <u>110</u> (A)	<u>490</u> (B)
Prevalence Index = B/A = <u>4.45</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1131

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/2	97	10YR 4/6	3	c	m	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1131
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.144649 Long: -87.973861 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> </tr> <tr> <td><input type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	Secondary Indicators (minimum of two required) <table style="width:100%; border: none;"> <tr><td><input checked="" type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td><input checked="" type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td><input checked="" type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)																														
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)																														
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<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)																														
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<input checked="" type="checkbox"/> Geomorphic Position (D2)																															
<input type="checkbox"/> Shallow Aquitard (D3)																															
<input type="checkbox"/> Microtopographic Relief (D4)																															
<input checked="" type="checkbox"/> FAC-Neutral Test (D5)																															

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
--	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1131

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
		<u>5</u>	= Total Cover

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Bidens frondosa</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Carex vulpinoidea</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Echinochloa crus-galli</u>	<u>15</u>	<u>No</u>	<u>FAC</u>
4. <u>Carex shortiana</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
5. <u>Sium suave</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
6. <u>Juncus effusus</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. <u>Solidago altissima</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
		<u>85</u>	= Total Cover

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
		_____	= Total Cover

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>30</u>	x 1 =	<u>30</u>
FACW species <u>30</u>	x 2 =	<u>60</u>
FAC species <u>25</u>	x 3 =	<u>75</u>
FACU species <u>5</u>	x 4 =	<u>20</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>90</u> (A)		<u>185</u> (B)
Prevalence Index = B/A =		<u>2.06</u>

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1131

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/1	95	10YR 5/6	5	c	m	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1131
 Investigator(s): Crystal Renskers Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.144159 Long: -87.973424 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present?	Yes <u>X</u> No _____ Depth (inches): <u>surface</u>	
<small>(includes capillary fringe)</small>		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants.

Sampling Point: DP1131

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>25</u>	x 1 =	<u>25</u>
FACW species <u>20</u>	x 2 =	<u>40</u>
FAC species <u>0</u>	x 3 =	<u>0</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>45</u> (A)		<u>65</u> (B)
Prevalence Index = B/A =		<u>1.44</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Elymus virginicus</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Sium suave</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Glyceria striata</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1131

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16"	10YR 5/1	95	10YR 5/6	5	c	m	Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1201

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.155204 Long: -87.974702 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1201

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Galium aparine</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Persicaria maculosa</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Ambrosia trifida</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
4. <u>Carex blanda</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
5. <u>Viola sororia</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>5</u>	x 2 = <u>10</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>40</u> (A)	<u>135</u> (B)

Prevalence Index = B/A = 3.38

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1201

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	7.5YR 3/1	100					Silt Loam	
3-12"	7.5YR 5/2	100					Silt Loam	
12-18"	7.5YR 5/2	95	7.5YR 4/6	5	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/24/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1202

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.150772 Long: -87.980038 Datum: NAD83

Soil Map Unit Name: Lindsay silt loam, ponded (Lp) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u>_____</u> Surface Water (A1)	<u>_____</u> Water-Stained Leaves (B9)	<u>_____</u> Sparsely Vegetated Concave Surface (B8)
<u>_____</u> High Water Table (A2)	<u>_____</u> Aquatic Fauna (B13)	<u>_____</u> Drainage Patterns (B10)
<u>_____</u> Saturation (A3)	<u>_____</u> True Aquatic Plants (B14)	<u>_____</u> Moss Trim Lines (B16)
<u>_____</u> Water Marks (B1)	<u>_____</u> Hydrogen Sulfide Odor (C1)	<u>_____</u> Dry-Season Water Table (C2)
<u>_____</u> Sediment Deposits (B2)	<u>_____</u> Oxidized Rhizospheres on Living Roots (C3)	<u>_____</u> Crayfish Burrows (C8)
<u>X</u> Drift Deposits (B3)	<u>_____</u> Presence of Reduced Iron (C4)	<u>_____</u> Saturation Visible on Aerial Imagery (C9)
<u>_____</u> Algal Mat or Crust (B4)	<u>_____</u> Recent Iron Reduction in Tilled Soils (C6)	<u>_____</u> Stunted or Stressed Plants (D1)
<u>_____</u> Iron Deposits (B5)	<u>_____</u> Thin Muck Surface (C7)	<u>X</u> Geomorphic Position (D2)
<u>_____</u> Inundation Visible on Aerial Imagery (B7)	<u>_____</u> Other (Explain in Remarks)	<u>_____</u> Shallow Aquitard (D3)
		<u>_____</u> Microtopographic Relief (D4)
		<u>_____</u> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1202

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Packera glabella</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
3. <u>Persicaria maculosa</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Column Total:	Multiply by:	Result:
OBL species	<u>10</u>	x 1 =	<u>10</u>
FACW species	<u>5</u>	x 2 =	<u>10</u>
FAC species	<u>50</u>	x 3 =	<u>150</u>
FACU species	<u>0</u>	x 4 =	<u>0</u>
UPL species	<u>0</u>	x 5 =	<u>0</u>
Column Totals:	<u>65</u> (A)		<u>170</u> (B)

Prevalence Index = B/A = 2.62

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1202

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	7.5YR 4/2	100					Silt Loam	
3-12"	7.5YR 4/2	90	7.5YR 4/6	10	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1203

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.151687 Long: -87.984475 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 12 to 20 percent slopes, eroded (CrD2) NWI classification: PSS1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)
c

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1203

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carex normalis</u>	<u>70</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Persicaria pensylvanica</u>	<u>20</u>	<u>No</u>	<u>FACW</u>
3. <u>Echinochloa crus-galli</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>90</u>	x 2 = <u>180</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>110</u> (A)	<u>240</u> (B)

Prevalence Index = B/A = 2.18

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1203

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	7.5YR 5/2	90	7.5YR 4/6	10	C	M	Silt Loam	
10-18"	10YR 6/2	75	7.5yr 5/8	25	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1204

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.150868 Long: -87.984672 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: PSS1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes _____ No <u>X</u> _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1204

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Triticum aestivum</u>	<u>100</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Poa annua</u>	<u>1</u>	<u>No</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Toxicodendron radicans</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
_____	<u>5</u>	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	<u>x 1 = 0</u>
FACW species <u>0</u>	<u>x 2 = 0</u>
FAC species <u>5</u>	<u>x 3 = 15</u>
FACU species <u>1</u>	<u>x 4 = 4</u>
UPL species <u>100</u>	<u>x 5 = 500</u>
Column Totals: <u>106</u> (A)	<u>519</u> (B)
Prevalence Index = B/A = <u>4.90</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1204

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	7.5YR 5/2	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1205

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.150413 Long: -87.984686 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<u>X</u> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<u>X</u> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<u>X</u> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1205

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Packera glabella</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	<u>5</u> x 1 = <u>5</u>
FACW species <u>0</u>	<u>0</u> x 2 = <u>0</u>
FAC species <u>5</u>	<u>15</u> x 3 = <u>15</u>
FACU species <u>0</u>	<u>0</u> x 4 = <u>0</u>
UPL species <u>0</u>	<u>0</u> x 5 = <u>0</u>
Column Totals: <u>10</u> (A)	<u>20</u> (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1205

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	7.5YR 5/2	85	7.5YR 5/8	15	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1206

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.150292 Long: -87.984242 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: PUBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1206

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>30</u> (A)	<u>90</u> (B)
Prevalence Index = B/A = <u>3.00</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1207

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.149243 Long: -87.983948 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 6 to 12 percent slopes, severely eroded (CrC3) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		<u>X</u> Surface Soil Cracks (B6)
<u>_____</u> Surface Water (A1)	<u>_____</u> Water-Stained Leaves (B9)	<u>_____</u> Sparsely Vegetated Concave Surface (B8)
<u>_____</u> High Water Table (A2)	<u>_____</u> Aquatic Fauna (B13)	<u>_____</u> Drainage Patterns (B10)
<u>_____</u> Saturation (A3)	<u>_____</u> True Aquatic Plants (B14)	<u>_____</u> Moss Trim Lines (B16)
<u>_____</u> Water Marks (B1)	<u>_____</u> Hydrogen Sulfide Odor (C1)	<u>_____</u> Dry-Season Water Table (C2)
<u>_____</u> Sediment Deposits (B2)	<u>_____</u> Oxidized Rhizospheres on Living Roots (C3)	<u>_____</u> Crayfish Burrows (C8)
<u>X</u> Drift Deposits (B3)	<u>_____</u> Presence of Reduced Iron (C4)	<u>_____</u> Saturation Visible on Aerial Imagery (C9)
<u>X</u> Algal Mat or Crust (B4)	<u>_____</u> Recent Iron Reduction in Tilled Soils (C6)	<u>_____</u> Stunted or Stressed Plants (D1)
<u>_____</u> Iron Deposits (B5)	<u>_____</u> Thin Muck Surface (C7)	<u>X</u> Geomorphic Position (D2)
<u>_____</u> Inundation Visible on Aerial Imagery (B7)	<u>_____</u> Other (Explain in Remarks)	<u>_____</u> Shallow Aquitard (D3)
		<u>_____</u> Microtopographic Relief (D4)
		<u>X</u> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1207

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Packera glabella</u>	<u>5</u>	<u>Yes</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>25</u> (A)	<u>65</u> (B)
Prevalence Index = B/A = <u>2.60</u>	

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1207

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	7.5YR 5/2	85	7.5YR 5/8	15	C	M	Silty clay Loam	
10-16"	7.5yr 6/2	80	7.5YR 5/8	20	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1208

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.146402 Long: -87.983779 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1208

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>70</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Amaranthus tuberculatus</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. <u>Packera glabella</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Column Total:	Multiply by:	Product:
OBL species	<u>5</u>	x 1 =	<u>5</u>
FACW species	<u>10</u>	x 2 =	<u>20</u>
FAC species	<u>70</u>	x 3 =	<u>210</u>
FACU species	<u>0</u>	x 4 =	<u>0</u>
UPL species	<u>0</u>	x 5 =	<u>0</u>
Column Totals:	<u>85</u> (A)		<u>235</u> (B)

Prevalence Index = B/A = 2.76

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1208

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	7.5YR 5/2	85	7.5YR 5/8	15	C	M	SiltY Clay Loam	
10-16"	7.5YR 6/2	80	7.5YR 5/8	20	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1209
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.146044 Long: -87.984098 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)		
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)		
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)		
Field Observations:		Wetland Hydrology Present? Yes _____ No <u>X</u>	
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

VEGETATION - Use scientific names of plants.

Sampling Point: DP1209

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	40	Yes	FACW
2. <u>Acer saccharum</u>	30	Yes	FACU
3. <u>Aesculus glabra</u>	25	Yes	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lindera benzoin</u>	30	Yes	FAC
2. <u>Ptelea trifoliata</u>	10	Yes	FAC
3. <u>Aesculus glabra</u>	5	No	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>45</u>	x 3 = <u>135</u>
FACU species <u>130</u>	x 4 = <u>520</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>255</u> (A)	<u>815</u> (B)
Prevalence Index = B/A = <u>3.20</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sanicula odorata</u>	40	Yes	FACU
2. <u>Poa sylvestris</u>	25	Yes	FACW
3. <u>Galium aparine</u>	20	No	FACU
4. <u>Elymus villosus</u>	10	No	FACU
5. <u>Carex grayi</u>	10	No	FACW
6. <u>Impatiens capensis</u>	5	No	FACW
7. <u>Persicaria virginiana</u>	5	No	FAC
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1209

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/2	100					Silt Loam	
4-16"	7.5YR 5/6	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1210
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.149807 Long: -87.976872 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
---	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1210

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	40	Yes	FACW
2. <u>Acer saccharum</u>	30	Yes	FACU
3. <u>Aesculus glabra</u>	25	No	FACU
4. <u>Acer negundo</u>	25	No	FAC
5. <u>Maclura pomifera</u>	10	No	UPL
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	130	= Total Cover	

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Symphoricarpos orbiculatus</u>	30	Yes	FACU
2. <u>Aesculus glabra</u>	5	No	FACU
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	35	= Total Cover	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Sanicula odorata</u>	30	Yes	FACU
2. <u>Poa sylvestris</u>	25	Yes	FACW
3. <u>Impatiens capensis</u>	15	Yes	FACW
4. <u>Osmorhiza claytonii</u>	5	No	FACU
5. <u>Toxicodendron radicans</u>	5	No	FAC
6. <u>Smilax hispida</u>	5	No	FAC
7. <u>Persicaria virginiana</u>	5	No	FAC
8. <u>Urtica dioica</u>	5	No	FACU
9. <u>Verbesina alternifolia</u>	5	No	FAC
10. <u>Carex grisea</u>	5	No	FACU
11. <u>Viola canadensis</u>	5	No	FAC
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	110	= Total Cover	

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>50</u>	x 3 = <u>150</u>
FACU species <u>135</u>	x 4 = <u>540</u>
UPL species <u>10</u>	x 5 = <u>50</u>
Column Totals: <u>275</u> (A)	<u>900</u> (B)
Prevalence Index = B/A = <u>3.27</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1210

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 3/2	100					Silt Loam	
4-16"	7.5YR 5/6	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X** _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1211
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.153182 Long: -87.976515 Datum: NAD83
 Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1211

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Amaranthus tuberculatus</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. <u>Triticum aestivum</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>60</u>	x 3 = <u>180</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>1</u>	x 5 = <u>5</u>
Column Totals: <u>71</u> (A)	<u>205</u> (B)

Prevalence Index = B/A = 2.89

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1212

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none

Slope (%): 0% Lat: 37.148185 Long: -87.967732 Datum: NAD83

Soil Map Unit Name: Crider silt loam, 2 to 6 percent slopes, eroded (CrB2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____ No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1212

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Maclura pomifera</u>	<u>25</u>	<u>Yes</u>	<u>UPL</u>
3. <u>Acer negundo</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>
4. <u>Ulmus americana</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Rosa multiflora</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>110</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>0</u>	x 1 =	<u>0</u>
FACW species <u>77</u>	x 2 =	<u>154</u>
FAC species <u>25</u>	x 3 =	<u>75</u>
FACU species <u>17</u>	x 4 =	<u>68</u>
UPL species <u>115</u>	x 5 =	<u>575</u>
Column Totals: <u>234</u> (A)		<u>872</u> (B)
Prevalence Index = B/A =		<u>3.73</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Euonymus fortunei</u>	<u>90</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Impatiens capensis</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. <u>Arisaema dracontium</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
4. <u>Lactuca biennis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. <u>Poa sylvestris</u>	<u>2</u>	<u>No</u>	<u>FACW</u>
6. <u>Carex grisea</u>	<u>2</u>	<u>No</u>	<u>FACU</u>
7. _____	<u>2</u>	<u>No</u>	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>116</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1212

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	10YR 5/3	100					Silt Loam	
3-16"	10YR 4/6						Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1213
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.148185 Long: -87.967732 Datum: NAD83
 Soil Map Unit Name: Lindsay silt loam, occasionally flooded (Ld) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes _____ No <u>X</u>	Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____
Water Table Present? Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u>	Depth (inches): _____	
(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants.

Sampling Point: DP1213

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Triticum aestivum</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>60</u>	x 3 = <u>180</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>1</u>	x 5 = <u>5</u>
Column Totals: <u>61</u> (A)	<u>185</u> (B)

Prevalence Index = B/A = 3.03

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0¹

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1213

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	10YR 4/2	80	10YR 4/6	20	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1214
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.147662 Long: -87.971318 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1214

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Salix nigra</u>	10	Yes	OBL
2. <u>Fraxinus pennsylvanica</u>	10	Yes	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	10	Yes	OBL
2. <u>Acer negundo</u>	5	Yes	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>90</u>	x 1 = <u>90</u>
FACW species <u>25</u>	x 2 = <u>50</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>120</u> (A)	<u>155</u> (B)
Prevalence Index = B/A = <u>1.29</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Typha X glauca</u>	35	Yes	OBL
2. <u>Leersia oryzoides</u>	25	Yes	OBL
3. <u>Solidago gigantea</u>	10	No	FACW
4. <u>Symphotrichum puniceum</u>	10	No	OBL
5. <u>Persicaria pensylvanica</u>	5	No	FACW
6. <u>Carex typhina</u>	_____	_____	FACW
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1214

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12"	10YR 4/2	80	10YR 3/6	20	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if observed):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____</p>
--	---

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1215
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.147891 Long: -87.970335 Datum: NAD83
 Soil Map Unit Name: Elk silt loam, 1 to 4 percent slopes, rarely flooded (EkB) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1215

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Sida spinosa</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>60</u>	x 3 = <u>180</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>5</u>	x 5 = <u>25</u>
Column Totals: <u>65</u> (A)	<u>205</u> (B)
Prevalence Index = B/A = <u>3.15</u>	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1215

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	7.5YR 4/2	100					Silt Loam	
3-12"	7.5YR 4/2	90	7.5YR 4/6	10	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1216
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Summit Local relief (concave, convex, none): none
 Slope (%): 0% Lat: 37.145928 Long: -87.972782 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1216

Tree Stratum (Plot size: <u>30 ft.</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Celtis occidentalis</u>	<u>35</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>Juniperus virginiana</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>
3.	<u>Prunus serotina</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>
4.	<u>Juglans nigra</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5.	<u>Diospyros virginiana</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6.				
7.				
		<u>100</u>	= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)				
1.	<u>Juglans nigra</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>Symphoricarpos orbiculatus</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>
3.		<u>g</u>	<u>Yes</u>	
4.				
5.				
6.				
7.				
		<u>10</u>	= Total Cover	
Herb Stratum (Plot size: <u>5 ft.</u>)				
1.	<u>Verbesina alternifolia</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>
2.	<u>Lonicera japonica</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
3.	<u>Toxicodendron radicans</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>
4.	<u>Poa sylvestris</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
5.	<u>Bromus inermis</u>	<u>10</u>	<u>No</u>	<u>UPL</u>
6.	<u>Elymus canadensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
7.	<u>Sanicula odorata</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
		<u>105</u>	= Total Cover	
Woody Vine Stratum (Plot size: <u>30 ft.</u>)				
1.				
2.				
3.				
4.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>15</u>	x 2 = <u>30</u>
FAC species <u>65</u>	x 3 = <u>195</u>
FACU species <u>125</u>	x 4 = <u>500</u>
UPL species <u>10</u>	x 5 = <u>50</u>
Column Totals: <u>215</u> (A)	<u>775</u> (B)
Prevalence Index = B/A = <u>3.60</u>	

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1216

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 4/2	100					Silt Loam	
6-16"	10yr 4/1	85	10YR 5/6	15	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1217
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.145706 Long: -87.973716 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1217

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Fraxinus pennsylvanica</u>	<u>65</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Ulmus americana</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Cephalanthus occidentalis</u>	<u>40</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Cornus racemosa</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>75</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>80</u>	x 1 =	<u>80</u>
FACW species <u>160</u>	x 2 =	<u>320</u>
FAC species <u>20</u>	x 3 =	<u>60</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>260</u> (A)		<u>460</u> (B)
Prevalence Index = B/A =		<u>1.77</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Bidens frondosa</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Carex cristatella</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Solidago gigantea</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Glyceria striata</u>	<u>15</u>	<u>No</u>	<u>OBL</u>
5. <u>Leersia virginica</u>	<u>15</u>	<u>No</u>	<u>FACW</u>
6. <u>Scirpus atrovirens</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
7. <u>Carex vulpinoidea</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
8. <u>Carex typhina</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
9. <u>Carex comosa</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>125</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Toxicodendron radicans</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	<u>10</u>	= Total Cover	

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1217

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12"	10YR 6/1	80	5YR 3/4	20	C	M	SiltY clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Stratified Layers (A5)	
<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input checked="" type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Umbric Surface (F13)	
<input type="checkbox"/> Red Parent Material (F21)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/25/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1218

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.146547 Long: -87.976540 Datum: NAD83

Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1218

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Quercus palustris</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>95</u>	x 2 = <u>190</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>110</u> (A)	<u>225</u> (B)
Prevalence Index = B/A = <u>2.05</u>	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Persicaria lapathifolia</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Echinochloa crus-galli</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
3. <u>Glyceria striata</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. <u>Bidens frondosa</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1218

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"	10YR 5/1	75	10YR 3/6	25	C	M	Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12)
- Umbric Surface (F13)
- Red Parent Material (F21)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Very Shallow Dark Surface (F22) (Test)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1219
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.146547 Long: -87.966742 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1219

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Celtis laevigata</u>	<u>35</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Ulmus americana</u>	<u>35</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Robinia pseudoacacia</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>95</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>12</u>	x 1 =	<u>12</u>
FACW species <u>130</u>	x 2 =	<u>260</u>
FAC species <u>40</u>	x 3 =	<u>120</u>
FACU species <u>7</u>	x 4 =	<u>28</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>189</u> (A)		<u>420</u> (B)
Prevalence Index = B/A =		<u>2.22</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Leersia virginica</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Scirpus atrovirens</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
4. <u>Packera glabella</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
5. <u>Acer negundo</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6. <u>Bidens frondosa</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. <u>Toxicodendron radicans</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
8. <u>Alisma subcordatum</u>	<u>2</u>	<u>No</u>	<u>OBL</u>
9. <u>Poa annua</u>	<u>2</u>	<u>No</u>	<u>FACU</u>
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>74</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Toxicodendron radicans</u>	_____	_____	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1219

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	7.5YR 5/1	75	5YR 4/6	25	C	PL	Silt Loam	
6-16"	7.5yr 6/2	85	7.5yr 5/6	15	C	M	Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Black Histic (A3)	<input checked="" type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> 2 cm Muck (A10)	<input checked="" type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Umbric Surface (F13)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
	<input type="checkbox"/> Very Shallow Dark Surface (F22) (Test)
	<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1220
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.146483 Long: -87.964241 Datum: NAD83
 Soil Map Unit Name: Nolin silt loam, occasionally flooded (No) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1220

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Echinochloa crus-galli</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Triticum aestivum</u>	<u>1</u>	<u>No</u>	<u>UPL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>60</u>	x 3 = <u>180</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>1</u>	x 5 = <u>5</u>
Column Totals: <u>61</u> (A)	<u>185</u> (B)

Prevalence Index = B/A = 3.03

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1221

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.143670 Long: -87.971431 Datum: NAD83

Soil Map Unit Name: Henshaw silt loam, 0 to 2 percent slopes, rarely flooded (He) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____		
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u>	Depth (inches): _____		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1221

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Quercus palustris</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 10 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 91% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ulmus americana</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	<u>15</u>	= Total Cover	

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species <u>10</u>	x 1 =	<u>10</u>
FACW species <u>55</u>	x 2 =	<u>110</u>
FAC species <u>45</u>	x 3 =	<u>135</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>15</u>	x 5 =	<u>75</u>
Column Totals: <u>125</u> (A)		<u>330</u> (B)
Prevalence Index = B/A = <u>2.64</u>		

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Verbesina alternifolia</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Carex lupuliformis</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Carex vulpinoidea</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
4. <u>Leersia virginica</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
5. <u>Persicaria maculosa</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
6. <u>Triticum aestivum</u>	<u>10</u>	<u>Yes</u>	<u>UPL</u>
7. <u>Echinochloa crus-galli</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
8. <u>Juncus tenuis</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
9. <u>Sida spinosa</u>	<u>5</u>	<u>No</u>	<u>UPL</u>
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
	<u>100</u>	= Total Cover	

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Hydrophytic Vegetation Present ?

Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1222
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.145307 Long: -87.970211 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: (Explain alternative procedures here or in a separate report.)			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
--	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1222

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Carpinus caroliniana</u>	<u>35</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Celtis laevigata</u>	<u>35</u>	<u>Yes</u>	<u>FACW</u>
3. <u>Quercus palustris</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Liquidambar styraciflua</u>	<u>20</u>	<u>No</u>	<u>FAC</u>
5. <u>Carya ovata</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>120</u>		= Total Cover	

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Ulmus americana</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>20</u>		= Total Cover	

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Glyceria striata</u>	<u>60</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Microstegium vimineum</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
3. <u>Carex normalis</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>
4. <u>Impatiens capensis</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
5. <u>Poa sylvestris</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
6. <u>Leersia virginica</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. <u>Solidago gigantea</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
8. <u>Elymus virginicus</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
9. <u>Sanicula odorata</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____
<u>140</u>		= Total Cover	

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
_____		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>60</u>	x 1 =	<u>60</u>
FACW species <u>135</u>	x 2 =	<u>270</u>
FAC species <u>75</u>	x 3 =	<u>225</u>
FACU species <u>10</u>	x 4 =	<u>40</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>280</u> (A)		<u>595</u> (B)
Prevalence Index = B/A =		<u>2.13</u>

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

_____ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/26/2021
 Applicant/Owner: Geronimo State: KY Sampling Point: DP1223
 Investigator(s): Ben Harvey Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave
 Slope (%): 0% Lat: 37.146471 Long: -87.970139 Datum: NAD83
 Soil Map Unit Name: Newark silt loam, occasionally flooded (Ne) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.)		

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1223

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>Yes</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	Result
OBL species <u>75</u>	x 1 =	<u>75</u>
FACW species <u>10</u>	x 2 =	<u>20</u>
FAC species <u>15</u>	x 3 =	<u>45</u>
FACU species <u>0</u>	x 4 =	<u>0</u>
UPL species <u>0</u>	x 5 =	<u>0</u>
Column Totals: <u>100</u> (A)		<u>140</u> (B)
Prevalence Index = B/A =		<u>1.40</u>

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Leersia oryzoides</u>	<u>40</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Cicuta maculata</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
3. <u>Carex molesta</u>	<u>15</u>	<u>No</u>	<u>FAC</u>
4. <u>Carex frankii</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
5. <u>Hibiscus laevis</u>	<u>5</u>	<u>No</u>	<u>OBL</u>
6. <u>Carex cristatella</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No _____

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM -- Eastern Mountains and Piedmont Region

Project/Site: Caldwell City/County: Caldwell Sampling Date: 5/27/2021

Applicant/Owner: Geronimo State: KY Sampling Point: DP1224

Investigator(s): Ben Harvey Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave

Slope (%): 0% Lat: 37.145081 Long: -87.966407 Datum: NAD83

Soil Map Unit Name: Henshaw silt loam, 0 to 2 percent slopes, rarely flooded (He) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:			Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present?	Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present?	Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1224

Tree Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Quercus palustris</u>	45	Yes	FACW
2. <u>Fraxinus pennsylvanica</u>	30	Yes	FACW
3. <u>Celtis laevigata</u>	15	No	FACW
4. <u>Salix interior</u>	10	No	FACW
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Sapling/Shrub Stratum (Plot size: <u>15 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Prevalence Index worksheet:

Total % Cover of:	Column Total:	Multiply by:	Result:
OBL species <u>15</u>	<u>210</u> (A)	x 1 =	<u>15</u>
FACW species <u>130</u>		x 2 =	<u>260</u>
FAC species <u>55</u>		x 3 =	<u>165</u>
FACU species <u>10</u>		x 4 =	<u>40</u>
UPL species <u>0</u>		x 5 =	<u>0</u>
Column Totals:	<u>210</u> (A)		<u>480</u> (B)

Prevalence Index = B/A = 2.29

Herb Stratum (Plot size: <u>5 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus tenuis</u>	30	Yes	FAC
2. <u>Lonicera japonica</u>	15	Yes	FAC
3. <u>Carex comosa</u>	10	Yes	OBL
4. <u>Carex tribuloides</u>	10	Yes	FACW
5. <u>Impatiens capensis</u>	10	Yes	FACW
6. <u>Rumex crispus</u>	5	No	FAC
7. <u>Galium aparine</u>	5	No	FACU
8. <u>Carex normalis</u>	5	No	FACW
9. <u>Urtica dioica</u>	5	No	FACU
10. <u>Carex vulpinoidea</u>	5	No	OBL
11. <u>Solidago gigantea</u>	5	No	FACW
12. <u>Microstegium vimineum</u>	5	No	FAC
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____
17. _____	_____	_____	_____
18. _____	_____	_____	_____
19. _____	_____	_____	_____
20. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:

 Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: <u>30 ft.</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Definitions of Vegetation Strata:

Tree - Woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 inches DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present ?

Yes x No

Remarks: (Include photo numbers here or on a separate sheet.)

Caldwell Solar, Caldwell County,
Kentucky

APPENDIX

D

WETLAND FORMS

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w001	Evaluator name: Ben Hess
Date of evaluation: 4/6/20	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees)	Email: ben.hess@cardno.com
County: Caldwell	Evaluator affiliation and address: Cardno, 3901 Industrial BLVD INDPLS, IN
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes No	

Attachments: Complete and check (✓) each box

- Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
- Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
- Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)

See wetland delineation report

Actual Wetland Size (indicate units): 1.31 acres

Wetland Type (indicate NWI & HGM classifications): PEM/UB & Depressional

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Sinkhole depression pond

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w001	Rater(s): BRH	Date: 4/6/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>1.31</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	5
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		Score 0
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	0
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river	35	4 pts
Low:	<input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field	4	2 pts
	<input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage	1	1 pts
	<input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course <input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		
	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway	60	0 pts
	<input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	0
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 2	Sub-total: 7
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Site: w001	Rater(s): BRH	Date: 4/6/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		4
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
Alteration	Alteration	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
tile(s) in or near the wetland	non-stormwater discharge(s)	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
weir(s) in or near the wetland	dredging activities in or near the wetland	
stream channelization	filling/grading activities in or near the wetland	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 15	Subtotal 22
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Site: w001	Rater(s): BRH	Date: 4/6/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input checked="" type="checkbox"/>	<input type="checkbox"/>		plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input checked="" type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) ⁹	Subtotal 31
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input checked="" type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	5
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 5	Subtotal 36
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
					0 pts	0	0

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score absent	
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score absent	
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 0	
6a. Vegetative Components Score		0
Subtotal		0

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	2
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input checked="" type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input checked="" type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

standing water present

Subtotal 2

Site: w001	Rater(s): BRH	Date: 4/6/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

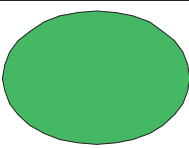
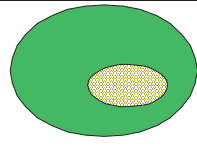
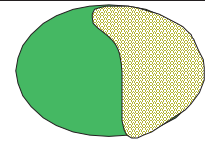
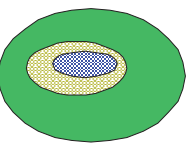
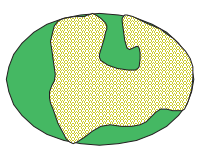
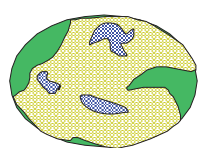
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha</i> <i>ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it . The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	1
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 2

Site: w001	Rater(s): BRH	Date: 4/6/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	2
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score ⁴
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	5	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	2	12
Metric 3: Hydrology	15	29
Metric 4: Habitat Alteration and Habitat Structure Development	9	20
Metric 5: Special Situations	5	10
Metric 6: Vegetation, Interspersion, and Habitat Features	4	20
Total Score = 40		100 pts. Max.

Site: w001

Rater(s): BRH

Date: 4/6/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w002
Date of evaluation: 4/6/20
Lat/Long coordinates: (decimal degrees)
County: Caldwell
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name: Ben Hess
Phone number: 317-388-1982
Email: ben.hess@cardno.com
Evaluator affiliation and address: Cardno, 3901 Industrial BLVD INDPLS, IN

<p>Attachments: Complete and check (✓) each box</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input checked="" type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input checked="" type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features) See wetland delineation report</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units): 0.06 acres</p>
<p>Wetland Type (indicate NWI & HGM classifications): PFO & Depressional</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w002	Rater(s): BRH	Date: 4/6/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.06</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w002	Rater(s): BRH	Date: 4/6/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter				4 pts
Medium Buffer Width: 75 to <150 feet around the perimeter				3 pts
Narrow Buffer Width: 25 to <75 feet around the perimeter				2 pts
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter				0 pts
				4

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:		Estimate % of each category here ↓	
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	4	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	6	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	8	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad		
	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake		
High:	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	72	0 pts
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	0
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 4	Sub-total: 7
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Site: w002	Rater(s): BRH	Date: 4/6/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		2
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 19	Subtotal 26
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Site: w002	Rater(s): BRH	Date: 4/6/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 16	Subtotal 42
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Site: w002	Rater(s): BRH	Date: 4/6/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 42
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*Score can be negative

Site: w002	Rater(s): BRH	Date: 4/6/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt	1		
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts		0	0

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	Score
	1
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	Score
	0
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	Score
	0

6a. Vegetative Components Score	1
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Subtotal	1
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Site: w002	Rater(s): BRH	Date: 4/6/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

Site: w002	Rater(s): BRH	Date: 4/6/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

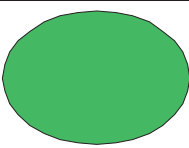
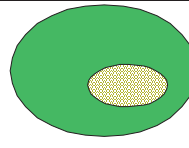
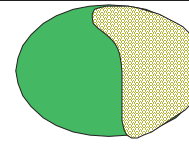
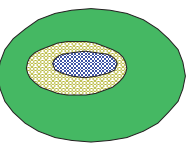
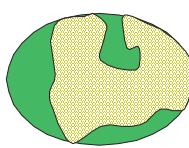
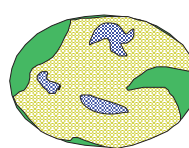
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

Site: w002	Rater(s): BRH	Date: 4/6/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	2
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score ⁴
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	4	12
Metric 3: Hydrology	19	29
Metric 4: Habitat Alteration and Habitat Structure Development	16	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	4	20
Total Score = 46		100 pts. Max.

Site: w002

Rater(s): BRH

Date: 4/6/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w003
Date of evaluation: 4/6/20
Lat/Long coordinates: (decimal degrees)
County: Caldwell
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name: Ben Hess
Phone number: 317-388-1982
Email: ben.hess@cardno.com
Evaluator affiliation and address: Cardno, 3901 Industrial BLVD INDPLS, IN

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input checked="" type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input checked="" type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features) See wetland delineation report</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units): 0.49 acres</p>
<p>Wetland Type (indicate NWI & HGM classifications): PFO & Depressional</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Wet Depression Sinkhole Forest

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w003	Rater(s): BRH	Date: 4/6/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.49</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	5
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w003	Rater(s): BRH	Date: 4/6/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter				4 pts
Medium Buffer Width: 75 to <150 feet around the perimeter				3 pts
Narrow Buffer Width: 25 to <75 feet around the perimeter				2 pts
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter				0 pts
				4

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:		Estimate % of each category here ↓	
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	55	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	0	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	0	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake		
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	45	0 pts
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 8	Sub-total: 13
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Site: w003	Rater(s): BRH	Date: 4/6/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	4
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 22	Subtotal 35
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.
 Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances **within the wetland** below.

Low	High	Alteration	Low	High	Alteration	Low	High	Alteration
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>	<input checked="" type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)

Select an option below that best describes the extent of wetland soil alteration. You may select **adjoining** options and average the points when appropriate.

No Substrate or Soil Disturbance Apparent	4 pts	2
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations	3 pts	
The wetland substrate or soil was altered but was somewhat resilient to alterations	2 pts	
The wetland substrate or soil was altered and was not resilient to alterations	1 pt	

4b. Habitat Alteration – Maximum 9 points.
 Evaluate the intactness of the natural habitat and check all possible observed habitat alterations **within the wetland** below. Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.

Low	High	Alteration	Low	High	Alteration	Low	High	Alteration
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>	<input type="checkbox"/>	sedimentation
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>	<input type="checkbox"/>	dredging
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)

Select an option below that best describes the extent of wetland habitat alteration. You may select **adjoining** options and average the points when appropriate.

No Habitat Alterations Apparent	9 pts	9
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level	7 pts	
The wetland habitat was altered but appears to retain some degree of functions	3 pts	
The alterations are severely limiting habitat function of the wetland	1 pt	

4c. Habitat Reference Comparison – Maximum 7 points.
 Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do **not** consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.

Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select **adjoining** options and average the points.

Excellent: Wetland appears to represent the best of its type.	7 pts	3
Good: Wetland appears to be a good example of its type	5 pts	
Fair: Wetland appears to be a fair example of its type.	3 pts	
Poor: Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) 14	Subtotal 49
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 57
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts	2	2	2
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	Score
	2
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	Score
	2
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	Score
	2

6a. Vegetative Components Score	6
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Subtotal 6

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

<p>Primary Indicators (must have 1)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	<p>Secondary Indicators (must have 2)</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

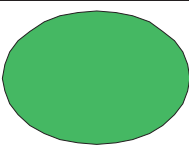
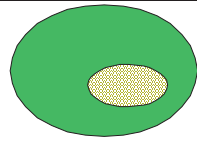
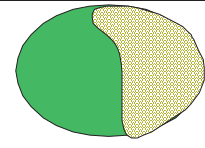
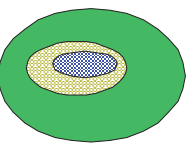
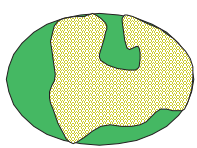
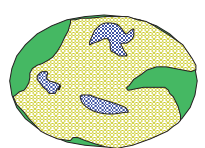
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it . The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 8
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	5	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	8	12
Metric 3: Hydrology	22	29
Metric 4: Habitat Alteration and Habitat Structure Development	14	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	8	20
Total Score = 65		100 pts. Max.

Site: w003

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Date: 4/6/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.49</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter				4 pts
Medium Buffer Width: 75 to <150 feet around the perimeter				3 pts
Narrow Buffer Width: 25 to <75 feet around the perimeter				2 pts
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter				0 pts
				4

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:		Estimate % of each category here ↓	
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	55	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	0	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	0	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake		
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	45	0 pts
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 8	Sub-total: 11
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	4
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 22	Subtotal 33
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input checked="" type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) ¹⁴	Subtotal ⁴⁷
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 55
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt	1	1	1
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score 1
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score 1
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 1
6a. Vegetative Components Score	3
Subtotal	3

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

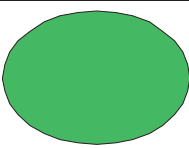
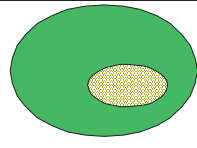
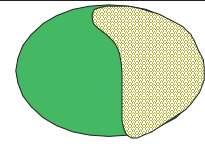
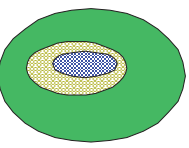
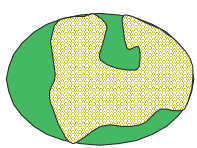
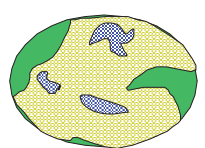
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

Site: w004	Rater(s): BRH	Date: 4/6/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 5
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	8	12
Metric 3: Hydrology	22	29
Metric 4: Habitat Alteration and Habitat Structure Development	14	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	5	20
Total Score = 60		100 pts. Max.

Site: w004

Rater(s): BRH

Date: 4/6/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w005	Rater(s): BRH	Date: 4/6/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.21</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	1
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	4
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w005	Rater(s): BRH	Date: 4/6/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter				4 pts
Medium Buffer Width: 75 to <150 feet around the perimeter				3 pts
Narrow Buffer Width: 25 to <75 feet around the perimeter				2 pts
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter				0 pts

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:		Estimate % of each category here ↓	
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	55	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	0	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	0	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake		
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	45	0 pts
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 6	Sub-total: 10
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Site: w005	Rater(s): BRH	Date: 4/6/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		2
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		7
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
Alteration	Alteration	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
tile(s) in or near the wetland	non-stormwater discharge(s)	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
weir(s) in or near the wetland	dredging activities in or near the wetland	
stream channelization	filling/grading activities in or near the wetland	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 13	Subtotal 23
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Site: w005	Rater(s): BRH	Date: 4/6/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input checked="" type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input checked="" type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) ⁸	Subtotal 31
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Site: w005	Rater(s): BRH	Date: 4/6/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 31
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*Score can be negative

Site: w005	Rater(s): BRH	Date: 4/6/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			2
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
					0 pts	0	0

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score
	absent
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score
	0
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score
	2
6a. Vegetative Components Score	
2	

Subtotal 2

Site: w005	Rater(s): BRH	Date: 4/6/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

Site: w005	Rater(s): BRH	Date: 4/6/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

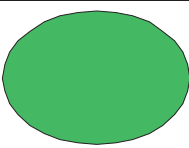
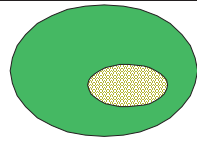
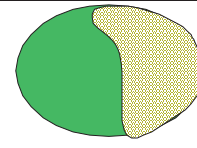
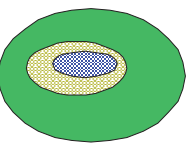
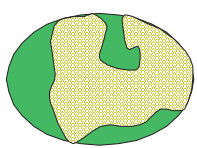
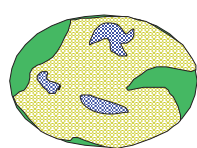
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	3
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 4

Site: w005	Rater(s): BRH	Date: 4/6/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score ⁷
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	4	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	6	12
Metric 3: Hydrology	13	29
Metric 4: Habitat Alteration and Habitat Structure Development	8	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	7	20
Total Score = 38		100 pts. Max.

Site: w005

Rater(s): BRH

Date: 4/6/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Site: w006	Rater(s): BRH	Date: 4/6/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.07</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w006	Rater(s): BRH	Date: 4/6/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include: <input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	Non-Buffers Include: <input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	Score
Wide Buffer Width: 150 feet around the perimeter	4 pts	3
Medium Buffer Width: 75 to <150 feet around the perimeter	3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter	2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter	0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river	18	4 pts
	<input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field	0	2 pts
Low:	<input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road	0	1 pts
Moderately High:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake	82	0 pts
High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value	Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts
Up to 1000 ft.	>25% of area is patch	2 pts
	<25% of area is patch	0 pts

Metric 2 Total: add 2a – 2c (12 points max.) 5	Sub-total: 8
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Site: w006	Rater(s): BRH	Date: 4/6/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		4
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 21	Subtotal 29
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Site: w006	Rater(s): BRH	Date: 4/6/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.
 Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances **within the wetland** below.

Low	High	Alteration	Low	High	Alteration	Low	High	Alteration
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)

Select an option below that best describes the extent of wetland soil alteration. You may select **adjoining** options and average the points when appropriate.

	Score
No Substrate or Soil Disturbance Apparent	4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations	3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations	2 pts
The wetland substrate or soil was altered and was not resilient to alterations	1 pt

4b. Habitat Alteration – Maximum 9 points.
 Evaluate the intactness of the natural habitat and check all possible observed habitat alterations **within the wetland** below. Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.

Low	High	Alteration	Low	High	Alteration	Low	High	Alteration
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>	<input type="checkbox"/>	sedimentation
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>	<input type="checkbox"/>	dredging
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading
<input type="checkbox"/>	<input checked="" type="checkbox"/>	clearcutting	<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)

Select an option below that best describes the extent of wetland habitat alteration. You may select **adjoining** options and average the points when appropriate.

	Score
No Habitat Alterations Apparent	9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level	7 pts
The wetland habitat was altered but appears to retain some degree of functions	3 pts
The alterations are severely limiting habitat function of the wetland	1 pt

4c. Habitat Reference Comparison – Maximum 7 points.
 Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do **not** consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.

Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select **adjoining** options and average the points.

	Score
Excellent: Wetland appears to represent the best of its type.	7 pts
Good: Wetland appears to be a good example of its type	5 pts
Fair: Wetland appears to be a fair example of its type.	3 pts
Poor: Wetland is a poor example of its type	1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 10	Subtotal 39
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Site: w006	Rater(s): BRH	Date: 4/6/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input checked="" type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 47
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*Score can be negative

Site: w006	Rater(s): BRH	Date: 4/6/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			2
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
					0 pts	0	0

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	Score
	absent
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	Score
	absent
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	Score
	2

6a. Vegetative Components Score	2
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Subtotal	2
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

Site: w006	Rater(s): BRH	Date: 4/6/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

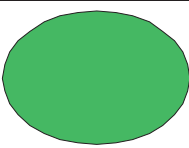
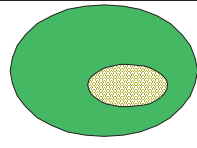
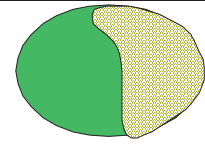
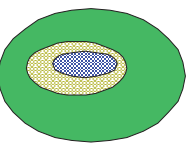
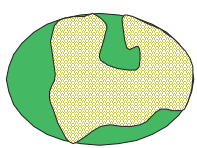
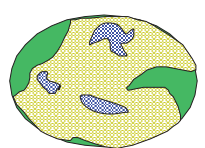
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it . The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	1
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 2

Site: w006	Rater(s): BRH	Date: 4/6/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 5
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	5	12
Metric 3: Hydrology	21	29
Metric 4: Habitat Alteration and Habitat Structure Development	10	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	5	20
Total Score = 52		100 pts. Max.

Site: w006

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Date: 4/6/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w007
Date of evaluation: 4/7/20
Lat/Long coordinates: (decimal degrees)
County: Caldwell
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name: Ben Hess
Phone number: 317-388-1982
Email: ben.hess@cardno.com
Evaluator affiliation and address: Cardno, 3901 Industrial BLVD INDPLS, IN

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input checked="" type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input checked="" type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features) See wetland delineation report</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units): 1.35 acres</p>
<p>Wetland Type (indicate NWI & HGM classifications): PEM & Riverine</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
Actual Wetland Size Estimate: <u>1.35</u> acres			
Wetland area proposed to be impacted: _____ %	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:	Non-Buffers Include:	
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	Score
Wide Buffer Width: 150 feet around the perimeter	4 pts	0
Medium Buffer Width: 75 to <150 feet around the perimeter	3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter	2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter	0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road	7	4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake	2	2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	3	1 pts
High:		88	0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value	Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts
Up to 1000 ft.	>25% of area is patch	2 pts
	<25% of area is patch	0 pts

Metric 2 Total: add 2a – 2c (12 points max.) 2	Sub-total: 5
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	4
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		4
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		7
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input type="checkbox"/> High <input type="checkbox"/> Alteration	
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 21	Subtotal 26
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input checked="" type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) ¹⁴	Subtotal 40
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 40
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts		3	
			Moderate to low native diversity	2 pts			2
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
					0 pts	0	

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score
	absent
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score
	3
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score
	2
6a. Vegetative Components Score	
5	

Subtotal 5

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 15

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

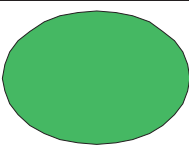
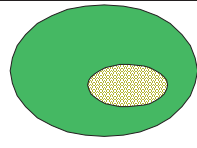
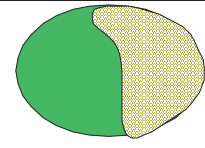
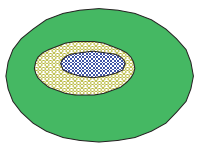
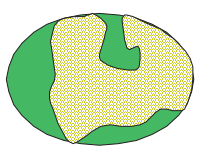
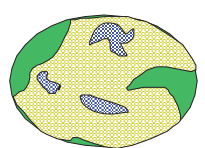
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input checked="" type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	-1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it . The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	3
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 2

Site: w007	Rater(s): BRH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				0

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score ⁷
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	2	12
Metric 3: Hydrology	21	29
Metric 4: Habitat Alteration and Habitat Structure Development	14	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	7	20
Total Score = 47		100 pts. Max.

Site: w007

Rater(s): BRH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Wet depression/sinkhole forest

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w008	Rater(s): BRH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	0 pts	
Actual Wetland Size Estimate: <u>0.07</u> acres			
Wetland area proposed to be impacted: _____ %			

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w008	Rater(s): BRH	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	4
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river	30	4 pts
Low:	<input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads	0	2 pts
	<input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years)	0	1 pts
	<input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		
	High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	70

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	2
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 8	Sub-total: 11
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Site: w008	Rater(s): BRH	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	4
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input type="checkbox"/> High <input type="checkbox"/> Alteration	
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 22	Subtotal 33
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Site: w008	Rater(s): BRH	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input checked="" type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) ¹⁴	Subtotal ⁴⁷
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Site: w008	Rater(s): BRH	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 55
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*Score can be negative

Site: w008	Rater(s): BRH	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt	1		1
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts		0	

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score 1
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score absent
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 1
6a. Vegetative Components Score	2
Subtotal	2

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

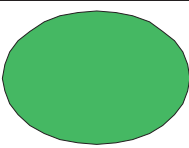
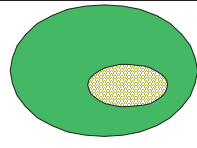
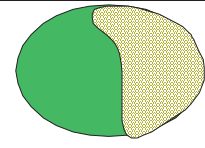
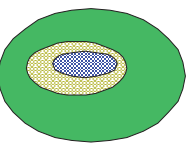
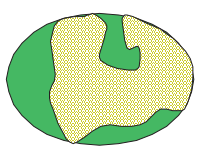
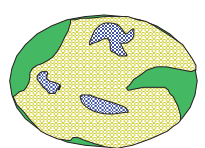
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it . The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

Site: w008	Rater(s): BRH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				0

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 3
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	8	12
Metric 3: Hydrology	22	29
Metric 4: Habitat Alteration and Habitat Structure Development	14	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	3	20
Total Score = 58		100 pts. Max.

Site: w008

Rater(s): BRH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Wet depression/sinkhole forest

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w009	Rater(s): BRH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	0 pts	
Actual Wetland Size Estimate: <u>0.81</u> acres			
Wetland area proposed to be impacted: _____ %			

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	5
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w009	Rater(s): BRH	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter				4 pts
Medium Buffer Width: 75 to <150 feet around the perimeter				3 pts
Narrow Buffer Width: 25 to <75 feet around the perimeter				2 pts
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter				0 pts
				3

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:		Estimate % of each category here ↓	
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	31	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	1	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	0	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	68	0 pts
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway		
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 7	Sub-total: 12
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Site: w009	Rater(s): BRH	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	6
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	4
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		4
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input type="checkbox"/> High <input type="checkbox"/> Alteration	
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 23	Subtotal 35
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Site: w009	Rater(s): BRH	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	5
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) 18	Subtotal 53
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
<p>Check all that apply, but maximum score is -10 points:</p> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 61
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*Score can be negative

Site: w009	Rater(s): BRH	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts		2	2
			Moderate to low native diversity	2 pts	2		
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	Score
	2
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	Score
	2
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	Score
	2

6a. Vegetative Components Score	6
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Subtotal 6

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	1
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input checked="" type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 1

Site: w009	Rater(s): BRH	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 2

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

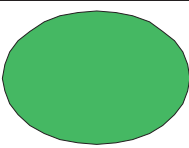
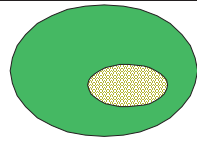
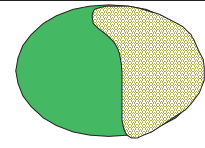
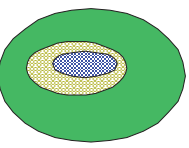
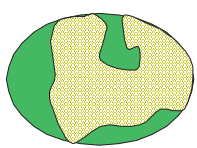
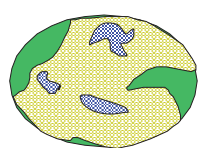
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input checked="" type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	0	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it . The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	3
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 3

Site: w009	Rater(s): BRH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	1
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	2
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	1
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	2
6e. Microtopographic Features Score				6

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 16
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	5	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	7	12
Metric 3: Hydrology	23	29
Metric 4: Habitat Alteration and Habitat Structure Development	18	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	16	20
Total Score = 77		100 pts. Max.

Site: w009

Rater(s): BRH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Wet depression/sinkhole forest

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w010	Rater(s): BRH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.16</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	1
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	4
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter		4 pts		4
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts		
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts		
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts		

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.				
	Land Use Types:		Estimate % of each category here ↓		Score
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	30	4 pts	2
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	0	2 pts	
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads			
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road			
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	0	1 pts	
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)			
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road			
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad			
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake			
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	70	0 pts	
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity			
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot			
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)			

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 8	Sub-total: 12
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input type="checkbox"/> High <input type="checkbox"/> Alteration	
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 16	Subtotal 28
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input checked="" type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 16	Subtotal 44
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 52
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts	2	2		
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			0
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
				2				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
				2				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
				0				
6a. Vegetative Components Score				4				
Subtotal 4								

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input checked="" type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

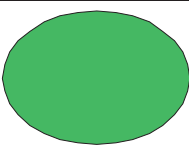
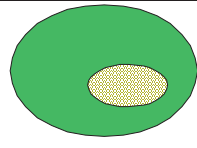
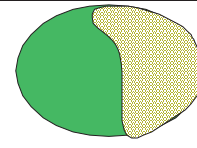
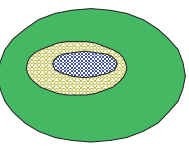
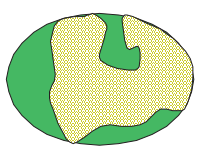
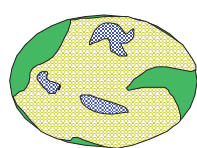
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

Site: w010	Rater(s): BRH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				0

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 5
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	4	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	8	12
Metric 3: Hydrology	16	29
Metric 4: Habitat Alteration and Habitat Structure Development	16	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	5	20
Total Score = 57		100 pts. Max.

Site: w010

Rater(s): BRH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Wet depression/sinkhole forest

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w011	Rater(s): BRH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.03</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w011	Rater(s): BRH	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	4
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road	27 0	4 pts 2 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake	0	1 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	73	0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 8	Sub-total: 11
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Site: w011	Rater(s): BRH	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input type="checkbox"/> High <input type="checkbox"/> Alteration	
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 16	Subtotal 27
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Site: w011	Rater(s): BRH	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 15	Subtotal 42
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Site: w011	Rater(s): BRH	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 50
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*Score can be negative

Site: w011	Rater(s): BRH	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt	1	1	1
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	Score
	1
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	Score
	1
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	Score
	1

6a. Vegetative Components Score	3
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Subtotal	3
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Site: w011	Rater(s): BRH	Date: 4/7/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1)	OR →	Secondary Indicators (must have 2)
<input type="checkbox"/> Surface Water present on aerial imagery (A1)		<input type="checkbox"/> Sparsely vegetated concave surface (B8)
<input checked="" type="checkbox"/> Water marks (B1)		<input type="checkbox"/> Drainage patterns (B10)
<input type="checkbox"/> Inundation Visible of Aerial Imagery (B7)		<input type="checkbox"/> Moss trim lines (B16)
<input type="checkbox"/> Algal mat or crust (B4)		<input type="checkbox"/> Geomorphic position (D2)
<input type="checkbox"/> Presence of aquatic fauna (B13)		
<input type="checkbox"/> Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w011	Rater(s): BRH	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

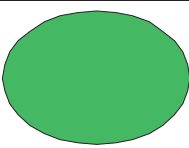
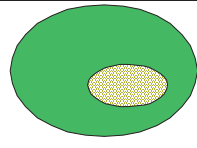
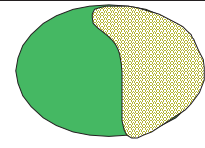
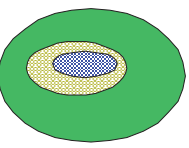
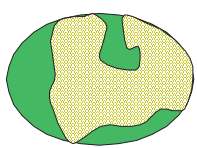
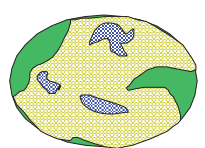
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

Site: w011	Rater(s): BRH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				0

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score ⁴
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	8	12
Metric 3: Hydrology	16	29
Metric 4: Habitat Alteration and Habitat Structure Development	15	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	4	20
Total Score = 54		100 pts. Max.

Site: w011

Rater(s): BRH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	w101
Date of evaluation:	4/7/20
Lat/Long coordinates: (decimal degrees)	
County:	Caldwell
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes No	

Evaluator name:	Crystal Renskers
Phone number:	317-388-1982
Email:	crystal.renswers@cardno.com
Evaluator affiliation and address:	Cardno, 3901 Industrial BLVD INDPLS, IN

Attachments: Complete and check (v) each box	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input checked="" type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input checked="" type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
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Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)	See wetland delineation report

Actual Wetland Size (indicate units):	0.04 acres
Wetland Type (indicate NWI & HGM classifications):	PFO & Depressional

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area. Wet depression/sinkhole forest

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w101	Rater(s): CDAR	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.03</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	1 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w101	Rater(s): CDAR	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	2
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	3
	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	4 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads	2 pts
Low:	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road	
	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	20
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)	1 pts
Moderately High:	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road	
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad	
	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	
High:	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	77
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity	0 pts
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot	
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 4	Sub-total: 7
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Site: w101	Rater(s): CDAR	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		1
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		3
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 8	Subtotal 15
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 15	Subtotal 30
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	8
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 8	Subtotal 38
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt		1	1
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score absent
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score 1
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 1
6a. Vegetative Components Score	2
Subtotal	2

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input checked="" type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 0

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

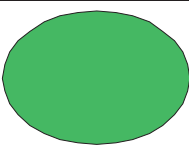
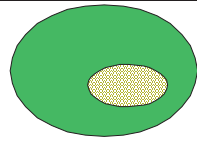
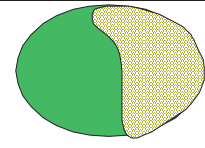
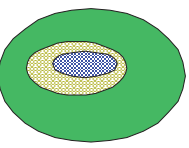
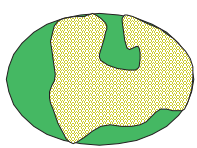
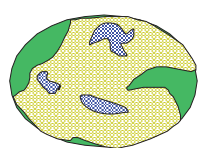
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt	1
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts	
Low:	5% to <25% aerial coverage of invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts	
Extensive:	>75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 1

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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	1
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 4
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	4	12
Metric 3: Hydrology	8	29
Metric 4: Habitat Alteration and Habitat Structure Development	15	20
Metric 5: Special Situations	8	10
Metric 6: Vegetation, Interspersion, and Habitat Features	4	20
Total Score = 42		100 pts. Max.

Site: w101

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Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w102
Date of evaluation: 4/7/20
Lat/Long coordinates: (decimal degrees)
County: Caldwell
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name: Crystal Renskers
Phone number: 317-388-1982
Email: crystal.renkers@cardno.com
Evaluator affiliation and address: Cardno, 3901 Industrial BLVD INDPLS, IN

Attachments: Complete and check (✓) each box

- ✓ Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
- ✓ Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
- ✓ Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)

See wetland delineation report

Actual Wetland Size (indicate units): 0.04 acres
Wetland Type (indicate NWI & HGM classifications): PFO & Depressional

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w102	Rater(s): CDAR	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.16</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w102	Rater(s): CDAR	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	2
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river	28	4 pts
Low:	<input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads	2	2 pts
	<input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		1 pts
High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	70	0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	2
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 6	Sub-total: 9
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Site: w102	Rater(s): CDAR	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		1
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		9
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 14	Subtotal 23
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Site: w102	Rater(s): CDAR	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) 15	Subtotal 38
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Site: w102	Rater(s): CDAR	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 38
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*Score can be negative

Site: w102	Rater(s): CDAR	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt		1	1
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	<p>Score absent</p>
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	<p>Score 1</p>
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	<p>Score 1</p>
<p>6a. Vegetative Components Score 2</p>	
<p>Subtotal 2</p>	

Site: w102	Rater(s): CDAR	Date: 4/7/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1)	OR →	Secondary Indicators (must have 2)
<input type="checkbox"/> Surface Water present on aerial imagery (A1)		<input type="checkbox"/> Sparsely vegetated concave surface (B8)
<input type="checkbox"/> Water marks (B1)		<input type="checkbox"/> Drainage patterns (B10)
<input type="checkbox"/> Inundation Visible of Aerial Imagery (B7)		<input type="checkbox"/> Moss trim lines (B16)
<input checked="" type="checkbox"/> Algal mat or crust (B4)		<input type="checkbox"/> Geomorphic position (D2)
<input type="checkbox"/> Presence of aquatic fauna (B13)		
<input type="checkbox"/> Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w102	Rater(s): CDAR	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

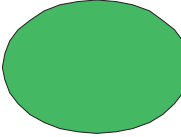
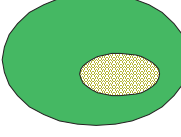
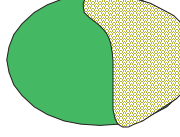
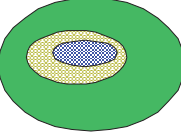
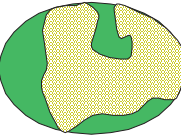
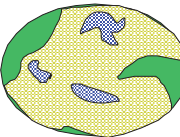
Estimate the total coverage. Choose only 1 category.

	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal 2

Site: w102	Rater(s): CDAR	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	1
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 6
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	6	12
Metric 3: Hydrology	14	29
Metric 4: Habitat Alteration and Habitat Structure Development	15	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	6	20
Total Score = 44		100 pts. Max.

Site: w102

Rater(s): CDAR

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	w103
Date of evaluation:	4/7/20
Lat/Long coordinates: (decimal degrees)	
County:	Caldwell
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes No	

Evaluator name:	Crystal Renskers
Phone number:	317-388-1982
Email:	crystal.renkers@cardno.com
Evaluator affiliation and address:	Cardno, 3901 Industrial BLVD INDPLS, IN

<p>Attachments: Complete and check (✓) each box</p> <ul style="list-style-type: none"> ☑ Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. ☑ Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. ☑ Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)
See wetland delineation report

<p>Actual Wetland Size (indicate units): 0.03 acres</p> <p>Wetland Type (indicate NWI & HGM classifications): PFO & Depressional</p>
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Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w103	Rater(s): CDAR	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.03</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w103	Rater(s): CDAR	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		Score
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	4
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	36
	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	4 pts
Low:	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads	2 pts
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road	
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	21
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)	1 pts
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road	
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad	
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	43
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity	0 pts
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot	
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 8	Sub-total: 11
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Site: w103	Rater(s): CDAR	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		9
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 14	Subtotal 25
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Site: w103	Rater(s): CDAR	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	5
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) 18	Subtotal 43
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Site: w103	Rater(s): CDAR	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 43
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*Score can be negative

Site: w103	Rater(s): CDAR	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt		1	
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
					0 pts	0	

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score 0
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score 1
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 0

6a. Vegetative Components Score	1
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Subtotal 44

Site: w103	Rater(s): CDAR	Date: 4/7/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 44

Site: w103	Rater(s): CDAR	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

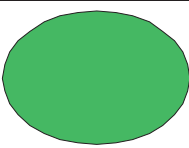
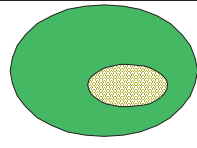
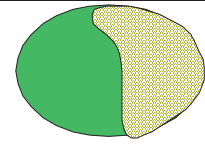
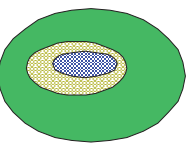
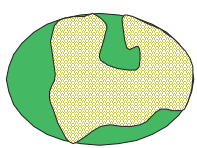
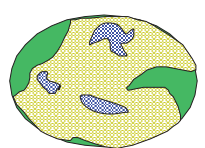
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha</i> <i>ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	5 pts	
Wetland has a high degree of interspersion	5 pts	1
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 2

Site: w103	Rater(s): CDAR	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 3
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	8	12
Metric 3: Hydrology	14	29
Metric 4: Habitat Alteration and Habitat Structure Development	18	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	3	20
Total Score = 46		100 pts. Max.

Site: w103

Rater(s): CDAR

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w104	Rater(s): CDAR	Date: 4/8/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.21</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	1
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	4
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w104	Rater(s): CDAR	Date: 4/8/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		Score 0
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	0
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads	
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road	
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	37
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)	
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road	
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad	
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	63
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity	
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot	
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 3	Sub-total: 7
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Site: w104	Rater(s): CDAR	Date: 4/8/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts		1
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts		
Seasonally Inundated (12.5 – 25% of growing season)	2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt		

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0"> <tr> <th>Low</th> <th>High</th> <th>Alteration</th> <th>Low</th> <th>High</th> <th>Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)			
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<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)																																								
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		Score																																									
No Hydrologic Alterations Apparent	9 pts	9																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																										
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																										
Alterations are severely impacting the hydrology of the wetland.	1 pt																																										

Metric 3 Total: add 3a – 3d (29 points max.) 12	Subtotal 19
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input checked="" type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input checked="" type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) ⁶	Subtotal 25
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 25
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*Score can be negative

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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts	0	0	2
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score 0
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score 0
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 2
6a. Vegetative Components Score	2

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 27

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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

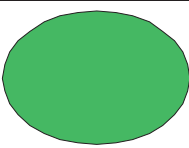
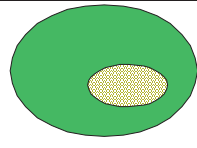
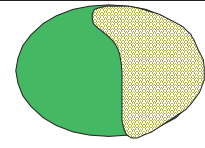
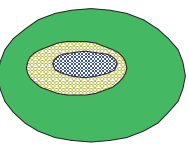
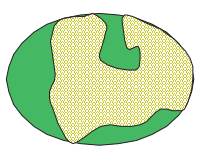
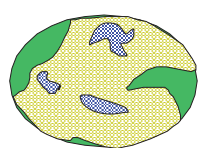
Estimate the total coverage. Choose only 1 category.

		Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts
Low:	5% to <25% aerial coverage of invasive species	-1 pt
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts
Extensive:	>75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 28

Site: w104	Rater(s): CDAR	Date: 4/8/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	2
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 4
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	4	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	3	12
Metric 3: Hydrology	12	29
Metric 4: Habitat Alteration and Habitat Structure Development	6	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	4	20
Total Score = 30		100 pts. Max.

Site: w104

Rater(s): CDAR

Date: 4/8/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	w105
Date of evaluation:	4/8/20
Lat/Long coordinates: (decimal degrees)	
County:	Caldwell
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes No	

Evaluator name:	Crystal Renskers
Phone number:	317-388-1982
Email:	crystal.renkers@cardno.com
Evaluator affiliation and address:	Cardno, 3901 Industrial BLVD INDPLS, IN

Attachments: Complete and check (v) each box

- Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
- Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
- Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)

See wetland delineation report

Actual Wetland Size (indicate units): 0.21 acres

Wetland Type (indicate NWI & HGM classifications): Emergent & Depressional

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w105	Rater(s): CDAR	Date: 4/8/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.05</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	< 0.1 acre	1 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	3
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w105	Rater(s): CDAR	Date: 4/8/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		Score 0
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	0
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads	
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road	
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	10
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)	
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road	
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad	
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	90
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity	
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot	
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	2
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 2	Sub-total: 5
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Site: w105	Rater(s): CDAR	Date: 4/8/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		1
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low	High	
<input type="checkbox"/>	<input type="checkbox"/>	
ditch(es) in or near the wetland	stormwater inputs (addition of water)	
<input type="checkbox"/>	<input type="checkbox"/>	
tile(s) in or near the wetland	non-stormwater discharge(s)	
<input type="checkbox"/>	<input type="checkbox"/>	
dike(s) in or near the wetland	road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
weir(s) in or near the wetland	dredging activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
stream channelization	filling/grading activities in or near the wetland	
<input type="checkbox"/>	<input type="checkbox"/>	
other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		9
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 13	Subtotal 18
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Site: w105	Rater(s): CDAR	Date: 4/8/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input checked="" type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) 13	Subtotal 31
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Site: w105	Rater(s): CDAR	Date: 4/8/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 31
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*Score can be negative

Site: w105	Rater(s): CDAR	Date: 4/8/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts	0	0	
			Low native diversity	1 pt			1
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score absent
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score absent
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 1
6a. Vegetative Components Score	2
Subtotal	33

Site: w105	Rater(s): CDAR	Date: 4/8/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input checked="" type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 31

Site: w105	Rater(s): CDAR	Date: 4/8/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

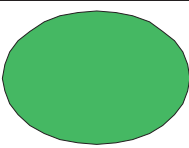
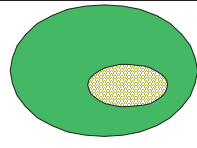
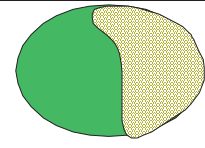
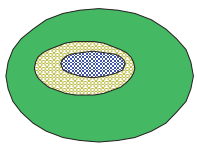
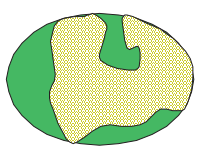
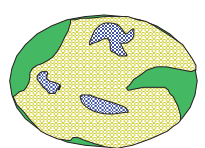
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt	1
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts	
Low:	5% to <25% aerial coverage of invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts	
Extensive:	>75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 34

Site: w105	Rater(s): CDAR	Date: 4/8/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	2
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 5
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	2	12
Metric 3: Hydrology	13	29
Metric 4: Habitat Alteration and Habitat Structure Development	13	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	5	20
Total Score = 36		100 pts. Max.

Site: w105

Rater(s): CDAR

Date: 4/8/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w201
Date of evaluation: 4/7/20
Lat/Long coordinates: (decimal degrees)
County: Caldwell
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name: Kaitlin Hillier
Phone number: 513-233-7041
Email: kaitlin.hillier@cardno.com
Evaluator affiliation and address: Cardno, 11121 canal road, cincinnati, OH 45241

- Attachments:** Complete and check (v) each box
- Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
 - Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
 - Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)
See wetland delineation report

Actual Wetland Size (indicate units): 0.03 acres

Wetland Type (indicate NWI & HGM classifications): PFO & Depressional

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Tile from neighboring field discharges into the wetland.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w201	Rater(s): KGH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.03</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	0
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	2	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	2
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w201	Rater(s): KGH	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score 2
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts		
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts		
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts		
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts		

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			Score	
	Land Use Types:	Estimate % of each category here ↓			
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> old field <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> one-lane paved road	20	4 pts 2 pts	0
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> manicured parkland <input type="checkbox"/> golf course <input type="checkbox"/> grazed pasture <input type="checkbox"/> utility right-of-way	<input type="checkbox"/> conservation tillage <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> two-lane road <input type="checkbox"/> railroad <input type="checkbox"/> man-made lake		1 pts	
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> high-density residential <input type="checkbox"/> heavily grazed pasture <input checked="" type="checkbox"/> row crop field	<input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> construction activity <input type="checkbox"/> parking lot <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	80	0 pts	
High:					

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value	Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts
Up to 1000 ft.	>25% of area is patch	2 pts
	<25% of area is patch	0 pts

Metric 2 Total: add 2a – 2c (12 points max.) 4	Sub-total: 6
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Site: w201	Rater(s): KGH	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	2
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		3
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																										
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		9																																										
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																												
<table border="0"> <tr> <th>Low</th> <th>High</th> <th>Alteration</th> <th>Low</th> <th>High</th> <th>Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low		High	Alteration	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)			
Low	High		Alteration	Low	High	Alteration																																						
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<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)																																									
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																												
No Hydrologic Alterations Apparent Wetland receives water from a tile;	9 pts																																											
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																											
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																											
Alterations are severely impacting the hydrology of the wetland.	1 pt																																											

Metric 3 Total: add 3a – 3d (29 points max.) 16	Subtotal 22
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Site: w201	Rater(s): KGH	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) ¹⁴	Subtotal 36
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Site: w201	Rater(s): KGH	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 36
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*Score can be negative

Site: w201	Rater(s): KGH	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt	x		
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts		x	x

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score 1
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score 0
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 0
6a. Vegetative Components Score	1
Subtotal 36	

Site: w201	Rater(s): KGH	Date: 4/7/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 36

Site: w201	Rater(s): KGH	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

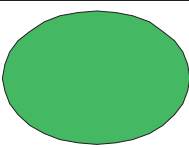
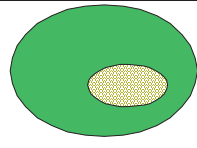
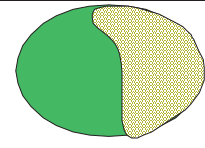
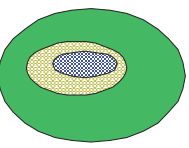
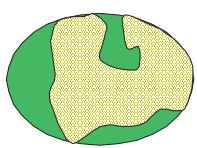
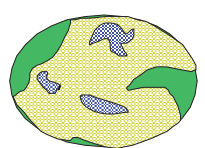
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	1	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal 37

Site: w201	Rater(s): KGH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	0
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	1
6e. Microtopographic Features Score				1

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 3
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	2	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	4	12
Metric 3: Hydrology	16	29
Metric 4: Habitat Alteration and Habitat Structure Development	14	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	3	20
Total Score = 39		100 pts. Max.

Site: w201

Rater(s): KGH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland: w202
Date of evaluation: 4/7/20
Lat/Long coordinates: (decimal degrees)
County: Caldwell
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name: Kaitlin Hillier
Phone number: 513-233-7041
Email: kaitlin.hillier@cardno.com
Evaluator affiliation and address: Cardno, 11121 canal road, cincinnati, OH 45241

<p>Attachments: Complete and check (✓) each box</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input checked="" type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input checked="" type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features) See wetland delineation report</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units): 0.64 acres</p>
<p>Wetland Type (indicate NWI & HGM classifications): PEM & Depressional</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w202	Rater(s): KGH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.64</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	2	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	4
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w202	Rater(s): KGH	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:		Non-Buffers Include:		Score 2
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> lawns, golf courses, manicured parkland	<input type="checkbox"/> residential, commercial, industrial	
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> roadways (including shoulders), parking lots	<input type="checkbox"/> railroad tracks/beds	
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> other wetland, lake, or river	<input checked="" type="checkbox"/> active agriculture: row crop field	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways	
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)		<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	
Wide Buffer Width: 150 feet around the perimeter		4 pts		
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts		
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts		
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts		

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:		Estimate % of each category here ↓	
Very Low:	<input checked="" type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	20	4 pts
Low:	<input type="checkbox"/> shrubland/young forest	<input checked="" type="checkbox"/> old field	15	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	5	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course	<input checked="" type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	60	0 pts
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway		
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot		
	<input checked="" type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	2
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 4	Sub-total: 6
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Site: w202	Rater(s): KGH	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	2
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0"> <tr> <th>Low</th> <th>High</th> <th>Alteration</th> <th>Low</th> <th>High</th> <th>Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)			
Low	High	Alteration	Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent	9 pts	7																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																										
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																										
Alterations are severely impacting the hydrology of the wetland.	1 pt																																										

Metric 3 Total: add 3a – 3d (29 points max.) 11	Subtotal 19
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Site: w202	Rater(s): KGH	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input checked="" type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 13	Subtotal 32
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Site: w202	Rater(s): KGH	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0

Subtotal 32

*Score can be negative

Site: w202	Rater(s): KGH	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.

Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			X
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

<p>Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.</p>	Score
	Absent
<p>Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.</p>	Score
	Absent
<p>Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).</p>	Score
	2

6a. Vegetative Components Score	2
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Subtotal	34
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Site: w202	Rater(s): KGH	Date: 4/7/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1)	OR →	Secondary Indicators (must have 2)
<input type="checkbox"/> Surface Water present on aerial imagery (A1)		<input type="checkbox"/> Sparsely vegetated concave surface (B8)
<input type="checkbox"/> Water marks (B1)		<input type="checkbox"/> Drainage patterns (B10)
<input checked="" type="checkbox"/> Inundation Visible of Aerial Imagery (B7)		<input type="checkbox"/> Moss trim lines (B16)
<input type="checkbox"/> Algal mat or crust (B4)		<input checked="" type="checkbox"/> Geomorphic position (D2)
<input type="checkbox"/> Presence of aquatic fauna (B13)		
<input type="checkbox"/> Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 34

Site: w202	Rater(s): KGH	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

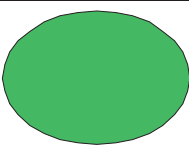
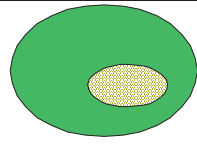
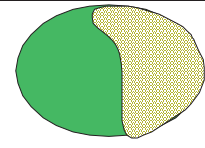
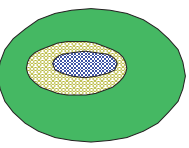
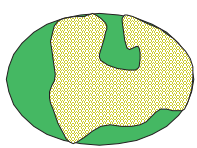
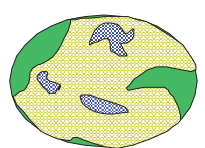
Estimate the total coverage. Choose only 1 category.

	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal 35

Site: w202	Rater(s): KGH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	3
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH).				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				3

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 6
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	4	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	4	12
Metric 3: Hydrology	11	29
Metric 4: Habitat Alteration and Habitat Structure Development	13	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	6	20
Total Score = 38		100 pts. Max.

Site: w202

Rater(s): KGH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w203	Rater(s): KGH	Date: 4/7/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.62</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	2	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	4
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w203	Rater(s): KGH	Date: 4/7/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter	4 pts	3	
Medium Buffer Width: 75 to <150 feet around the perimeter	3 pts		
Narrow Buffer Width: 25 to <75 feet around the perimeter	2 pts		
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter	0 pts		

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input checked="" type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road	15	4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input checked="" type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake	10	2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	5	1 pts
High:		70	0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	2
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.) 5	Sub-total: 9
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Site: w203	Rater(s): KGH	Date: 4/7/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		2
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		7
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low <input checked="" type="checkbox"/> High <input type="checkbox"/> Alteration	Low <input type="checkbox"/> High <input type="checkbox"/> Alteration	
<input checked="" type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	
<input checked="" type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> stream channelization	<input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.) 11	Subtotal 19
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Site: w203	Rater(s): KGH	Date: 4/7/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input checked="" type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input checked="" type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.) 13	Subtotal 32
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Site: w203	Rater(s): KGH	Date: 4/7/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points: <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input checked="" type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 32
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*Score can be negative

Site: w203	Rater(s): KGH	Date: 4/7/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			X
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt		X	
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score	Absent		
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score	1		
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score	2		
6a. Vegetative Components Score					3		
Subtotal					35		

Site: w203	Rater(s): KGH	Date: 4/7/20
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	Secondary Indicators (must have 2) <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 35

Site: w203	Rater(s): KGH	Date: 4/7/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

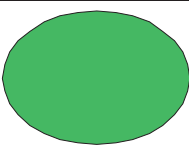
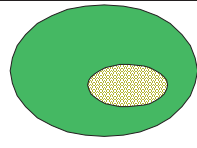
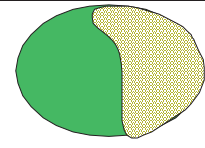
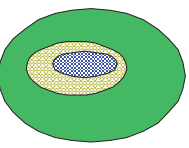
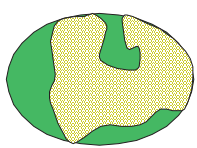
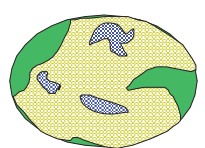
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input checked="" type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input checked="" type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	0	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal 35

Site: w203	Rater(s): KGH	Date: 4/7/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	2
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 5
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	4	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	5	12
Metric 3: Hydrology	11	29
Metric 4: Habitat Alteration and Habitat Structure Development	13	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	5	20
Total Score = 38		100 pts. Max.

Site: w203

Rater(s): KGH

Date: 4/7/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site: w204	Rater(s): KGH	Date: 4/8/20
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list): Actual Wetland Size Estimate: <u>0.73</u> acres Wetland area proposed to be impacted: _____ %	≥ 50 acres	6 pts	2
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
< 0.1 acre	0 pts		

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts	3	
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	5
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site: w204	Rater(s): KGH	Date: 4/8/20
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.

Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.

Buffers Include:	Non-Buffers Include:	
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)	Score
Wide Buffer Width: 150 feet around the perimeter	4 pts	0
Medium Buffer Width: 75 to <150 feet around the perimeter	3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter	2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter	0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.

If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:

Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.			
	Land Use Types:	Estimate % of each category here ↓		Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road	15	4 pts	0
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake	20	1 pts	
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	65	0 pts	
High:				

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.

Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural terrestrial habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.

Connected at:	Circle all categories that apply but report only the highest point value	Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts
Up to 1000 ft.	>25% of area is patch	2 pts
	<25% of area is patch	0 pts

Metric 2 Total: add 2a – 2c (12 points max.) 0	Sub-total: 5
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Site: w204	Rater(s): KGH	Date: 4/8/20
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	2
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	0
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		4
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0"> <tr> <th>Low</th> <th>High</th> <th>Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input checked="" type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0"> <tr> <th>Low</th> <th>High</th> <th>Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	7
Low	High	Alteration																																							
<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland																																							
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																							
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent		9 pts																																							
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																							
Alterations are severely impacting the hydrology of the wetland.		1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.) 13	Subtotal 18
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Site: w204	Rater(s): KGH	Date: 4/8/20
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input checked="" type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input checked="" type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3
Good:	Wetland appears to be a good example of its type	5 pts	
Fair:	Wetland appears to be a fair example of its type.	3 pts	
Poor:	Wetland is a poor example of its type	1 pt	

Metric 4 Total: add 4a – 4c (20 points max.) 13	Subtotal 31
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Site: w204	Rater(s): KGH	Date: 4/8/20
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	0
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input checked="" type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	0
5c. Low-Quality Wetland	Score
<p>Check all that apply, but maximum score is -10 points:</p> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	0

Metric 5 Total: add 5a – 5c (10 points max.)* 0	Subtotal 31
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*Score can be negative

Site: w204	Rater(s): KGH	Date: 4/8/20
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.
 Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).

Qualitative Cover Scoring Table

Habitat component - Check all that apply →					F	S	H
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			X
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt		X	
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			

Write in “absent” (don’t score it a zero) if habitat is not present.

Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.	Score Absent
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.	Score 1
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	Score 2
6a. Vegetative Components Score	3
Subtotal	34

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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	2
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input checked="" type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input checked="" type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal 36

Site: w204	Rater(s): KGH	Date: 4/8/20
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point. 0

Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

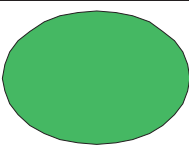
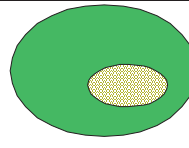
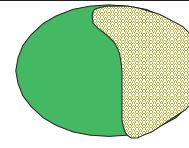
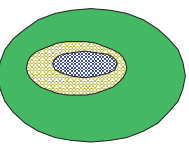
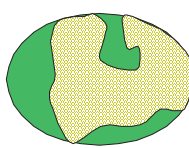
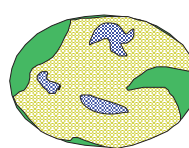
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input checked="" type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	0	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts		
Low: 5% to <25% aerial coverage of invasive species	-1 pt		
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts		
Extensive: >75% aerial coverage of invasive species	-5 pts		

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score	
Wetland has a high degree of interspersion	5 pts	1
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal 37

Site: w204	Rater(s): KGH	Date: 4/8/20
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	2
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	0
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	0
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	0
6e. Microtopographic Features Score				2

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score 8
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 2: KSNPC Rare Wetland Community Type Present?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	5	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	0	12
Metric 3: Hydrology	13	29
Metric 4: Habitat Alteration and Habitat Structure Development	13	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	8	20
Total Score = 39		100 pts. Max.

Site: w204

Rater(s): KGH

Date: 4/8/20

Scoring Comments:**HGM definitions:**

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input checked="" type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <td>Low</td> <td>High</td> <td>Alteration</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input checked="" type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <td>Low</td> <td>High</td> <td>Alteration</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
Low	High	Alteration																																									
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent		9 pts																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																									
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																									
Alterations are severely impacting the hydrology of the wetland.		1 pt																																									

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area			0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

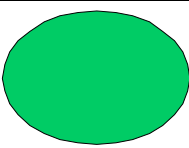
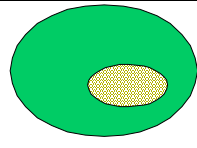
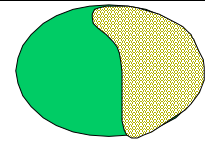
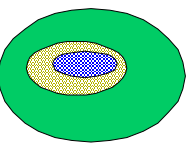
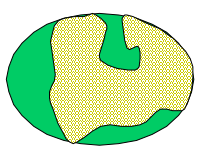
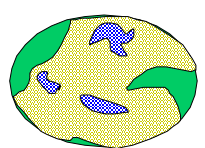
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

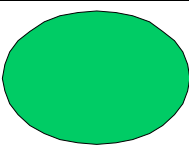
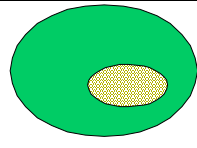
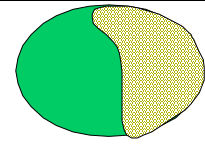
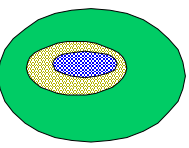
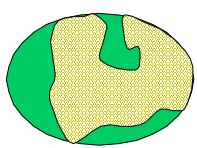
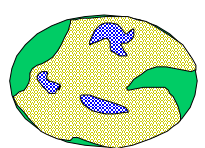
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
<input type="checkbox"/>	<input type="checkbox"/>		ditch(es) in or near the wetland																																						
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																							
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

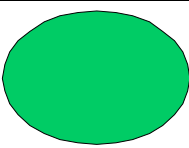
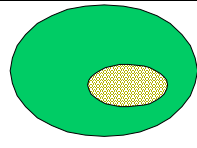
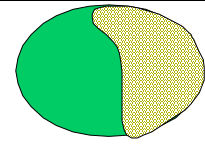
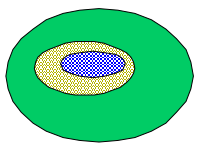
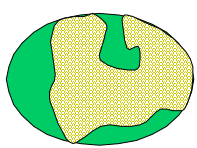
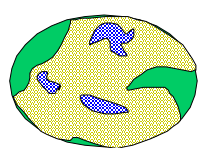
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

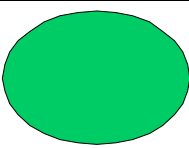
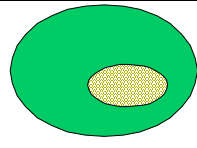
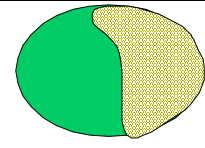
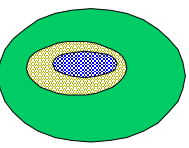
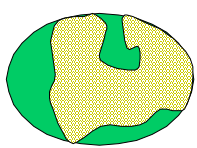
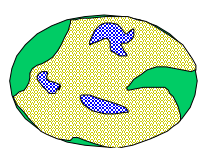
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts
Low:	5% to <25% aerial coverage of invasive species	-1 pt
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts
Extensive:	>75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	Score
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

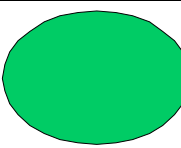
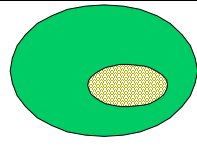
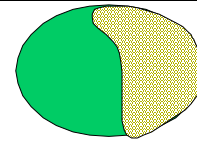
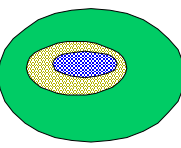
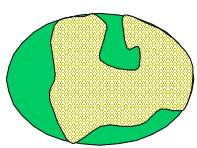
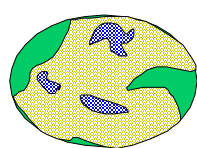
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

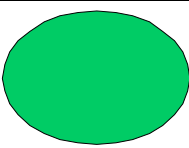
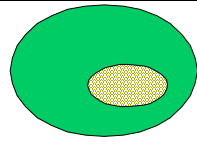
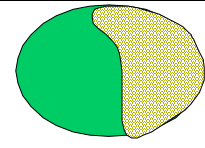
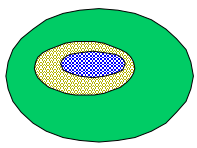
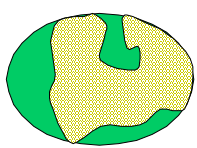
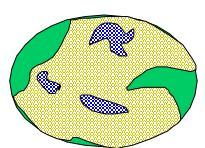
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

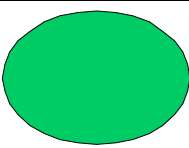
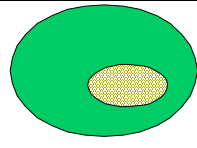
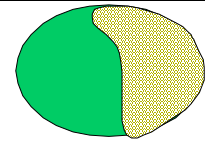
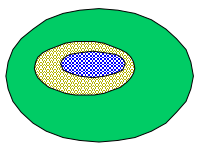
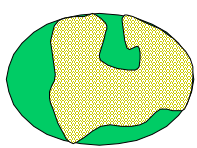
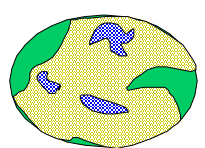
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.								
				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.								
				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).								
				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

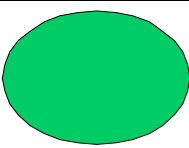
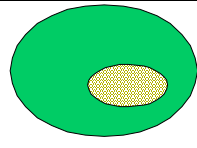
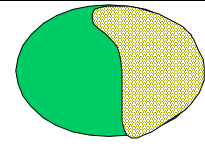
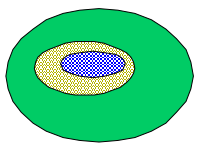
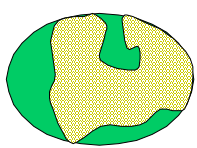
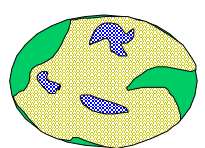
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts
Low:	5% to <25% aerial coverage of invasive species	-1 pt
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts
Extensive:	>75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion		5 pts	Score
Wetland has a moderate degree of interspersion		3 pts	
Wetland has a low degree of interspersion		1 pt	
Wetland has no interspersion		0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest	<input type="checkbox"/> other wetland, lake, stream, river	4 pts
Low:	<input checked="" type="checkbox"/> shrubland/young forest	<input type="checkbox"/> old field	2 pts
	<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> single track and two track dirt roads	
	<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> one-lane paved road	
Moderately High:	<input type="checkbox"/> residential & lawns	<input type="checkbox"/> conservation tillage	1 pts
	<input type="checkbox"/> manicured parkland	<input type="checkbox"/> recent logging and clear-cut (<5 years)	
	<input type="checkbox"/> golf course	<input type="checkbox"/> two-lane road	
	<input checked="" type="checkbox"/> grazed pasture	<input type="checkbox"/> railroad	
High:	<input type="checkbox"/> utility right-of-way	<input type="checkbox"/> man-made lake	0 pts
	<input type="checkbox"/> commercial, industrial	<input type="checkbox"/> multi-lane paved roadway	
	<input type="checkbox"/> high-density residential	<input type="checkbox"/> construction activity	
	<input type="checkbox"/> heavily grazed pasture	<input type="checkbox"/> parking lot	
	<input type="checkbox"/> row crop field	<input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)	

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
Low	High	Alteration																																									
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent		9 pts																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																									
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																									
Alterations are severely impacting the hydrology of the wetland.		1 pt																																									

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

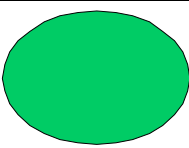
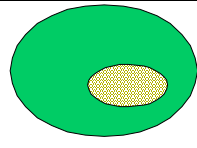
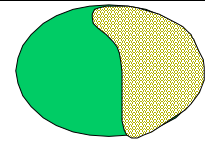
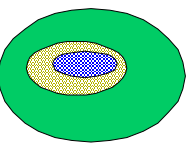
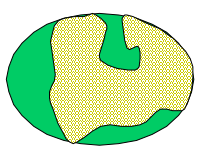
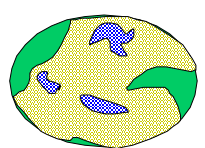
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent	9 pts																																							
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																							
Alterations are severely impacting the hydrology of the wetland.	1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat

- Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10].
- Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.

Score

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)

- Appalachian seep/bog (S1S2) [8]
- Bottomland marsh (S1S2) [8]
- Bottomland slough OR Coastal Plain Slough (S2) [5]
- Calcareous seep/bog (S1) [10]
- Coastal Plain forested acid seep (S1) [10]
- Cypress (tupelo) swamp (S1) [10]
- Sinkhole/depression marsh (S1S2) [8]
- Sinkhole/depression pond (S2) [5]
- Wet depression/sinkhole forest (S1S2) [8]
- Wet bottomland hardwood forest (S2) [5]
- Wet meadow (S1) [10]
- Wet prairie (S1) [10]

Score

5c. Low-Quality Wetland

Check all that apply, but maximum score is -10 points:

- Wetland is < 1 acre and has >75% cover of invasive plants [-10]
- Wetland is <1 acre and is nonvegetated mined/excavated land [-10]
- Wetland is <1 acre and is a constructed stormwater treatment pond [-10]

Score

Metric 5 Total: add 5a – 5c (10 points max.)*

Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

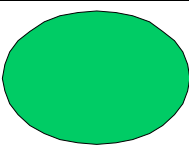
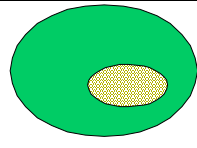
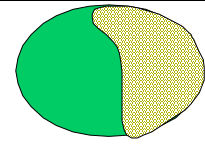
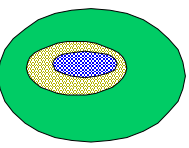
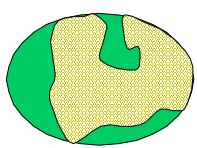
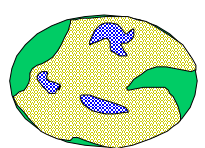
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input checked="" type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input checked="" type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	
5c. Low-Quality Wetland	Score
Check all that apply, but maximum score is -10 points:	
<input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

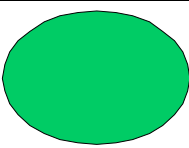
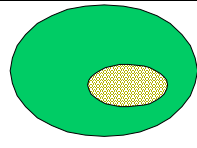
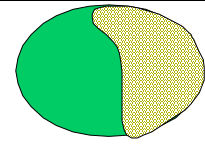
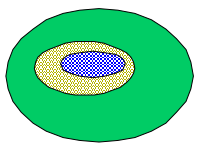
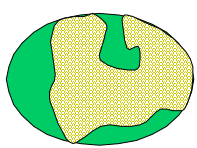
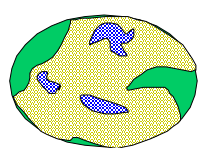
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input checked="" type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.								
				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.								
				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).								
				Score				
				6a. Vegetative Components Score				
				Subtotal				

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

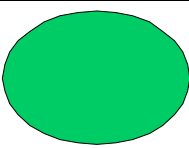
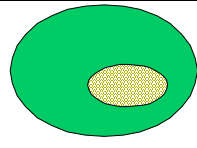
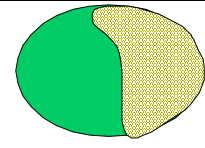
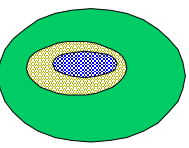
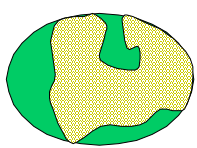
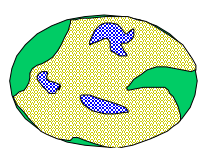
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input checked="" type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input checked="" type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
Low	High	Alteration																																									
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent		9 pts																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																									
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																									
Alterations are severely impacting the hydrology of the wetland.		1 pt																																									

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

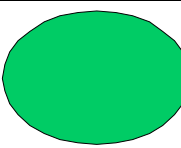
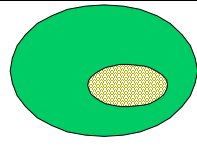
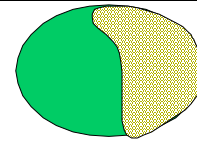
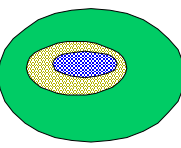
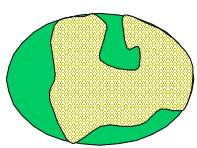
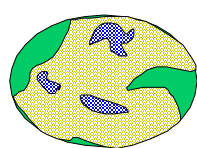
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned: fallow ag field- moderately high			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

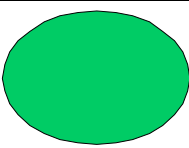
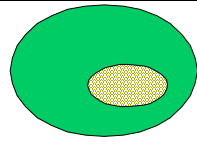
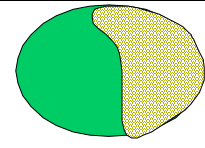
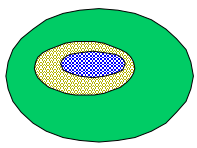
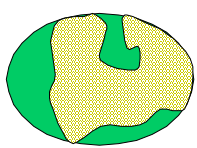
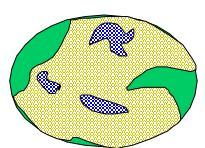
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

 NONE	 LOW	 LOW
 MODERATE	 MODERATE	 HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
Low	High	Alteration																																									
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent		9 pts																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																									
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																									
Alterations are severely impacting the hydrology of the wetland.		1 pt																																									

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

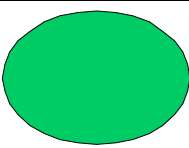
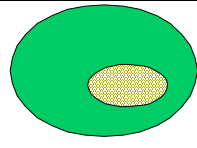
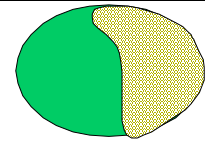
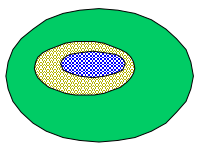
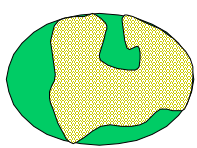
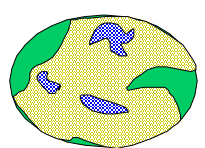
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	Evaluator name:
Date of evaluation:	Phone number:
Lat/Long coordinates: (decimal degrees)	Email:
County:	Evaluator affiliation and address:
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>	

Attachments: Complete and check (v) each box

- Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
- Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
- Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)

Actual Wetland Size (indicate units):

Wetland Type (indicate NWI & HGM classifications):

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

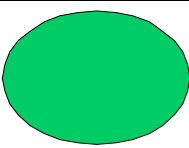
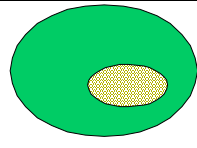
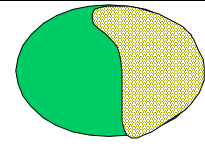
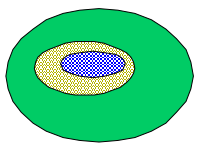
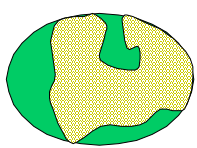
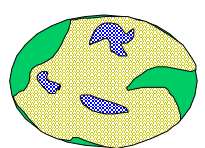
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake X mowed hay field		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage			0 pts			
		<25% of wetland area			0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of any invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

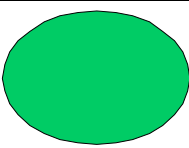
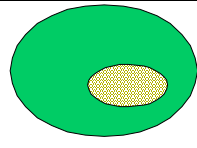
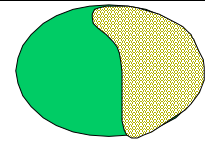
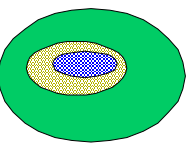
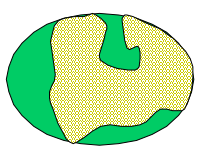
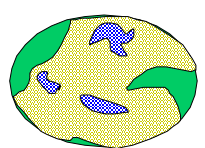
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake x Mowed Hay field		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

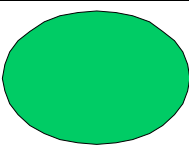
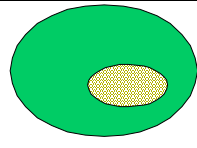
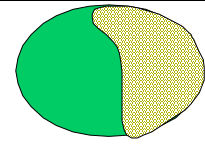
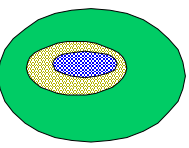
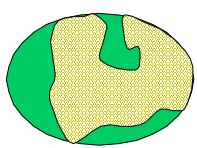
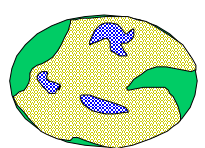
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	Evaluator name:
Date of evaluation:	Phone number:
Lat/Long coordinates: (decimal degrees)	Email:
County:	Evaluator affiliation and address:
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes (No)	

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake x mowed hay field		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	
Low	High	Alteration																																							
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent		9 pts																																							
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																							
Alterations are severely impacting the hydrology of the wetland.		1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

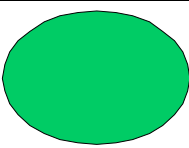
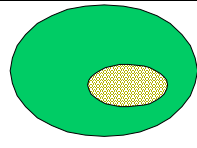
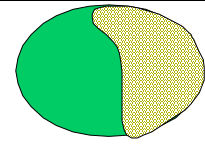
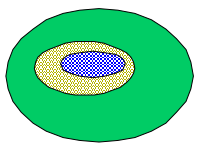
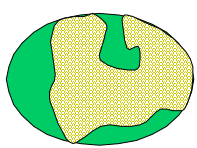
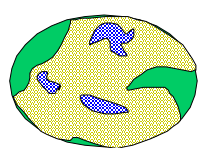
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	Evaluator name:
Date of evaluation:	Phone number:
Lat/Long coordinates: (decimal degrees)	Email:
County:	Evaluator affiliation and address:
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes (No)	

Attachments: Complete and check (✓) each box

- Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
- Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
- Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)

Actual Wetland Size (indicate units):

Wetland Type (indicate NWI & HGM classifications):

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	
Low	High	Alteration																																							
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent		9 pts																																							
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																							
Alterations are severely impacting the hydrology of the wetland.		1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

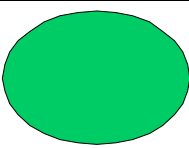
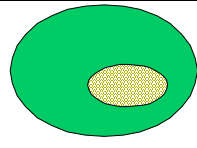
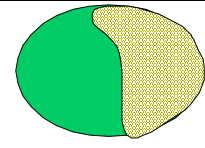
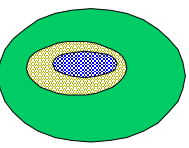
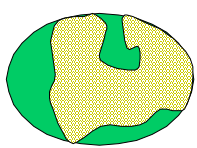
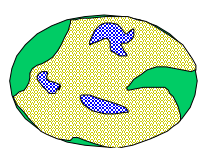
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river		4 pts
Low:	<input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		2 pts
	Moderately High:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake	
High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch		4 pts
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch		2 pts
	<input type="checkbox"/> <25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

<p>Primary Indicators (must have 1)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	<p>Secondary Indicators (must have 2)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

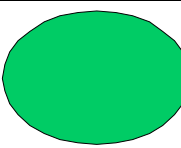
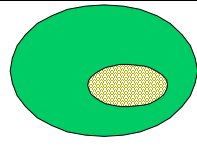
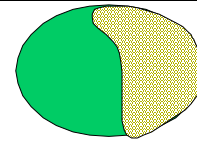
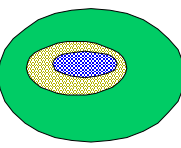
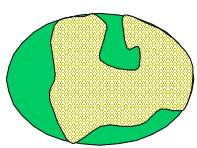
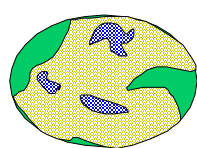
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input checked="" type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated (75 – 100% of growing season)	4 pts	
Regularly Inundated/ Saturated (25 – 75% of growing season)	3 pts	
Seasonally Inundated (12.5 – 25% of growing season)	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil (12.5 – 25% of growing season)	1 pt	

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent	9 pts	Score																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																							
Alterations are severely impacting the hydrology of the wetland.	1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only "historic" (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	
5c. Low-Quality Wetland	Score
<p>Check all that apply, but maximum score is -10 points:</p> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

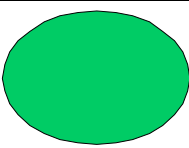
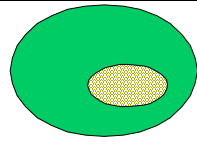
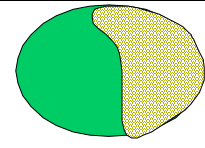
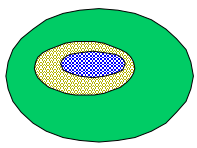
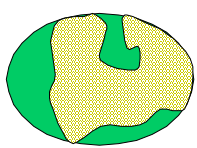
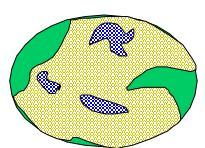
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input checked="" type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input checked="" type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

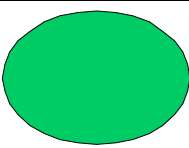
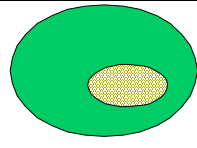
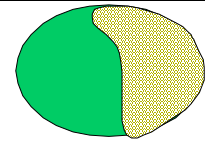
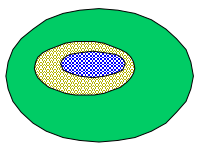
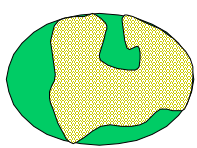
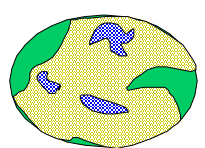
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake x new field		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent	9 pts	Score																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																							
Alterations are severely impacting the hydrology of the wetland.	1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

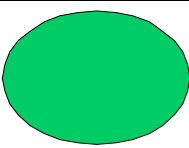
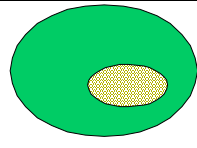
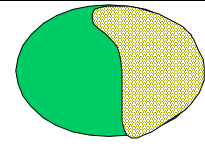
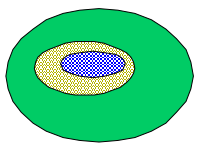
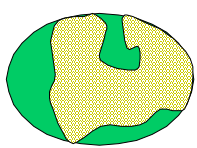
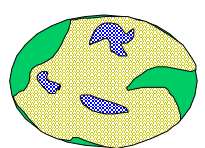
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt	
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts	
Low:	5% to <25% aerial coverage of invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts	
Extensive:	>75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

			Score
Wetland has a high degree of interspersion			5 pts
Wetland has a moderate degree of interspersion			3 pts
Wetland has a low degree of interspersion			1 pt
Wetland has no interspersion			0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake x new field		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

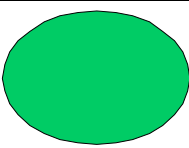
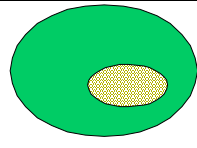
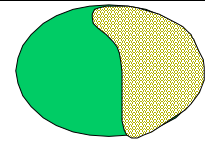
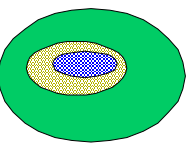
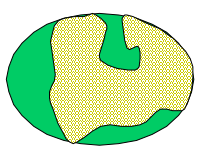
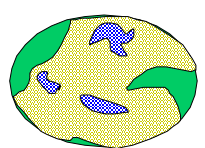
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent		9 pts																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																									
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																									
Alterations are severely impacting the hydrology of the wetland.		1 pt																																									

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

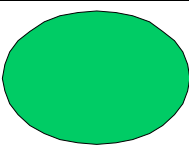
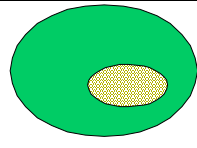
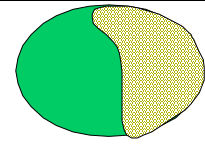
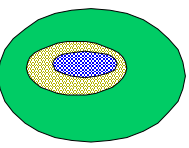
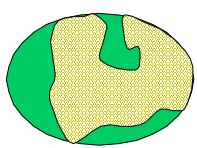
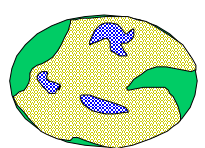
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	Evaluator name:
Date of evaluation:	Phone number:
Lat/Long coordinates: (decimal degrees)	Email:
County:	Evaluator affiliation and address:
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>	

Attachments: Complete and check (v) each box

- Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated.
- Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features.
- Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.

Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)

Actual Wetland Size (indicate units):

Wetland Type (indicate NWI & HGM classifications):

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																							
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.							
				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.							
				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).							
				Score			
				6a. Vegetative Components Score			
				Subtotal			

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

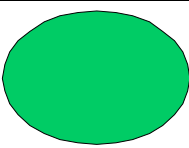
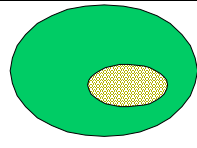
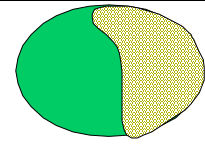
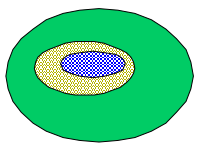
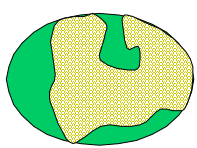
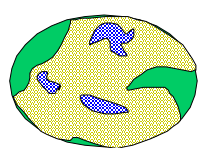
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> <input checked="" type="radio"/> No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (✓) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

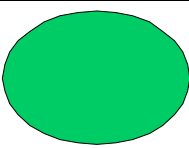
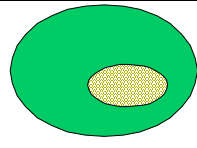
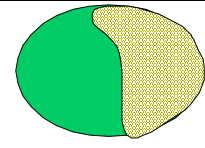
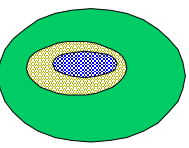
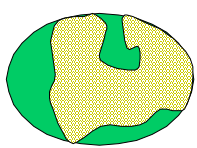
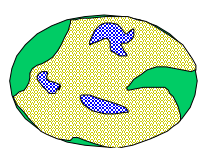
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

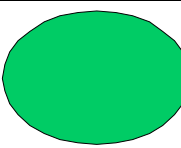
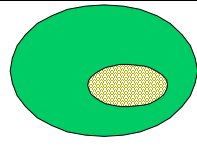
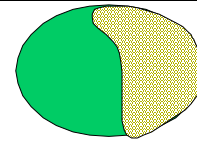
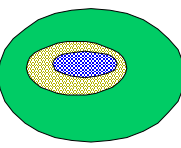
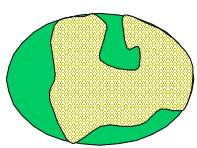
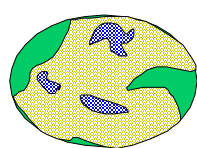
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: <input checked="" type="radio"/> Yes <input type="radio"/> No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent	9 pts	Score																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																							
Alterations are severely impacting the hydrology of the wetland.	1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

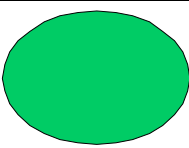
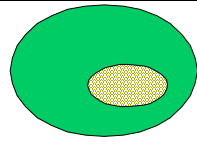
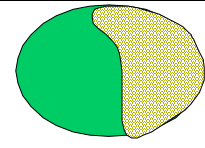
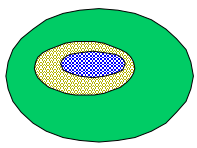
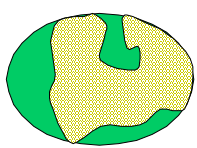
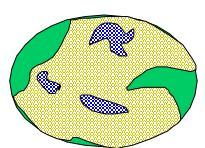
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:	Evaluator name:
Date of evaluation:	Phone number:
Lat/Long coordinates: (decimal degrees)	Email:
County:	Evaluator affiliation and address:
USACE/WQC Project ID:	
Precipitation within the last 48 hours? Circle: <input checked="" type="radio"/> Yes <input type="radio"/> No	

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p> <div style="height: 400px; border: 1px solid black;"></div>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of any invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

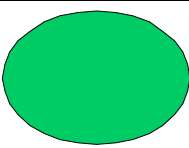
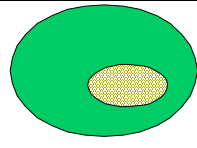
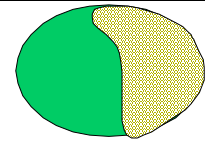
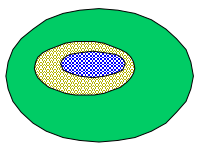
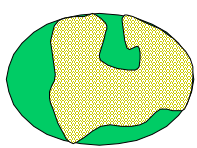
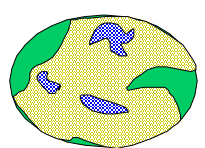
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

 NONE	 LOW	 LOW
 MODERATE	 MODERATE	 HIGH

Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: <input checked="" type="radio"/> Yes <input type="radio"/> No

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

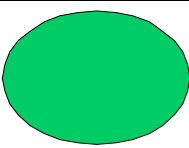
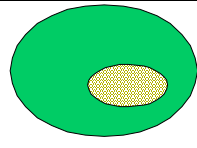
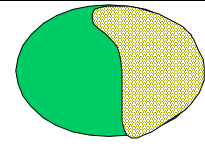
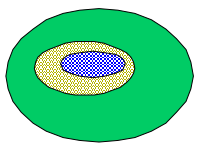
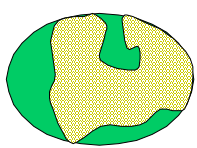
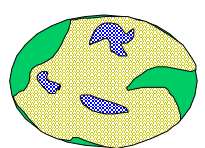
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent	9 pts	Score																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																							
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																							
Alterations are severely impacting the hydrology of the wetland.	1 pt																																							

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

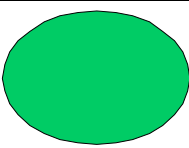
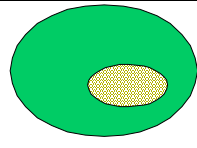
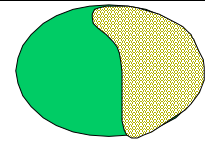
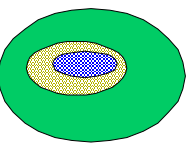
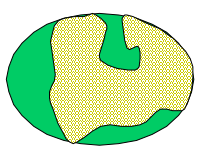
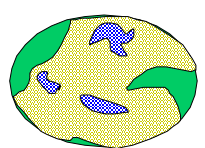
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent	9 pts	Score																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																										
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																										
Alterations are severely impacting the hydrology of the wetland.	1 pt																																										

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

5a. Regulatory Protection / Critical Habitat	Score
<input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed.	
5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	Score
<input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10]	
5c. Low-Quality Wetland	Score
<p>Check all that apply, but maximum score is -10 points:</p> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10]	
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

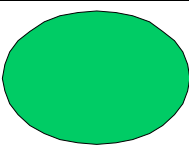
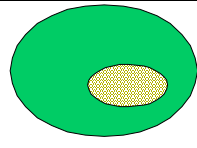
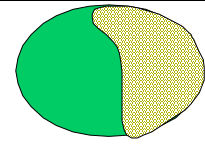
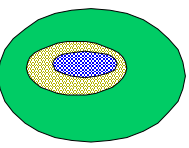
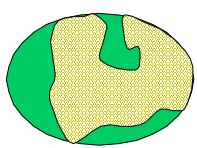
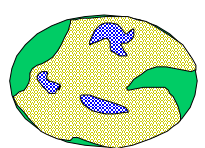
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts
Low:	5% to <25% aerial coverage of invasive species	-1 pt
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts
Extensive:	>75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion		5 pts
Wetland has a moderate degree of interspersion		3 pts
Wetland has a low degree of interspersion		1 pt
Wetland has no interspersion		0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
Low	High	Alteration																																									
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent		9 pts																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																									
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																									
Alterations are severely impacting the hydrology of the wetland.		1 pt																																									

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area			0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

<p>Primary Indicators (must have 1)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14) 	OR →	<p>Secondary Indicators (must have 2)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

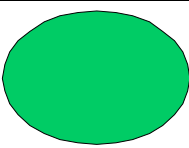
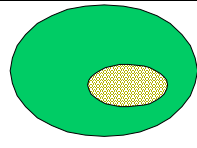
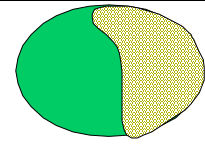
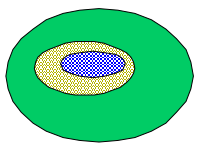
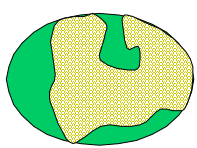
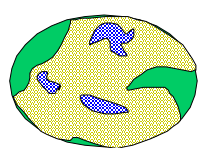
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch		4 pts
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch		2 pts
	<input type="checkbox"/> <25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																											
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																											
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																											
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> <tr> <td colspan="3">**only consider anthropogenic alterations (e.g. exclude beaver activity)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland	**only consider anthropogenic alterations (e.g. exclude beaver activity)		
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																											
No Hydrologic Alterations Apparent	9 pts	Score																																									
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																										
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																										
Alterations are severely impacting the hydrology of the wetland.	1 pt																																										

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage				0 pts		
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

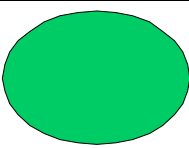
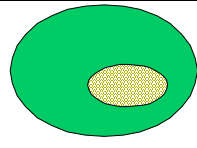
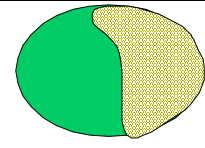
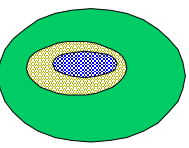
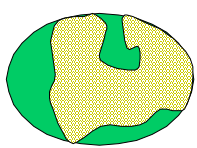
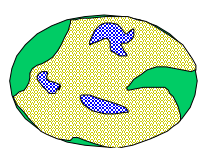
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																							
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

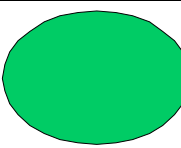
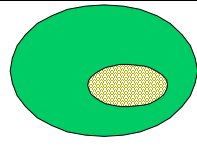
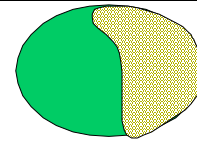
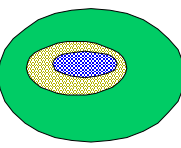
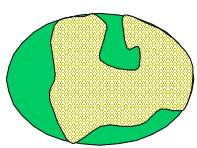
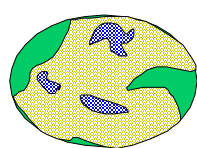
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

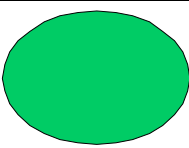
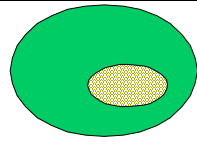
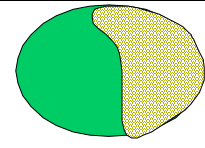
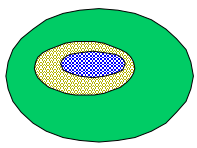
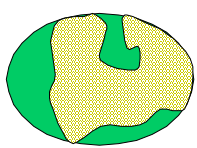
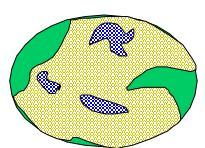
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch		4 pts
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch		2 pts
	<input type="checkbox"/> <25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts	F	S	H	
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.								
Score								
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.								
Score								
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).								
Score								
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

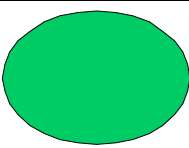
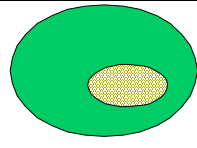
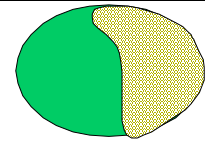
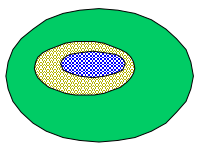
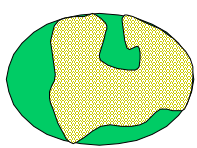
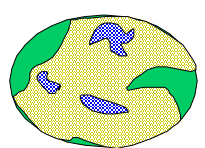
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

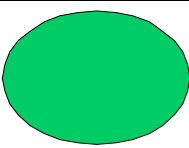
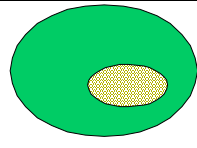
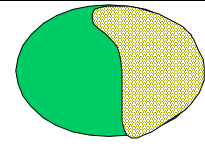
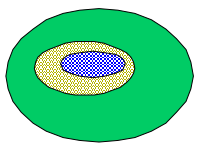
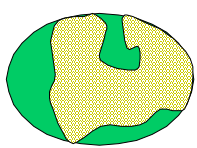
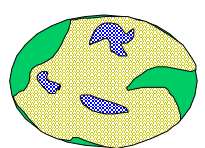
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score	
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	<input type="checkbox"/> lawns, golf courses, manicured parkland		
<input type="checkbox"/> abandoned row crop field (vegetated & naturalizing)	<input type="checkbox"/> residential, commercial, industrial		
<input type="checkbox"/> hay field (non-row crop)	<input type="checkbox"/> roadways (including shoulders), parking lots		
<input type="checkbox"/> lightly managed forest (selectively logged)	<input type="checkbox"/> railroad tracks/beds		
<input type="checkbox"/> lightly managed parkland	<input type="checkbox"/> active agriculture: row crop field		
<input type="checkbox"/> other wetland, lake, or river	<input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways		
<input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity		
	<input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river		4 pts
Low:	<input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field		2 pts
	<input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads		
	<input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		
Moderately High:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage		1 pts
	<input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years)		
	<input type="checkbox"/> golf course <input type="checkbox"/> two-lane road		
	<input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad		
High:	<input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		
	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway		0 pts
	<input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity		
	<input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot		
	<input type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch		4 pts
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch		2 pts
	<input type="checkbox"/> <25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

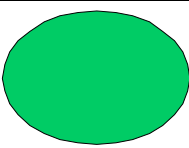
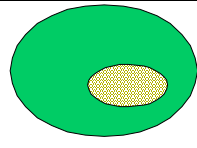
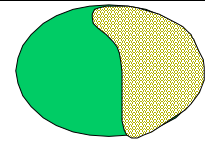
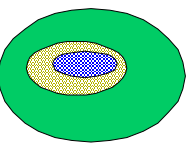
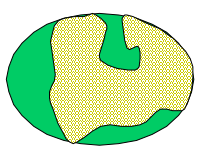
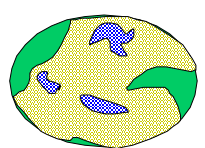
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.			Score
Virtually Absent:	<1% aerial coverage of invasive species	1 pt	
Nearly Absent:	1% to <5% aerial coverage of invasive species	0 pts	
Low:	5% to <25% aerial coverage of invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of invasive species	-3 pts	
Extensive:	>75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion			5 pts	
Wetland has a moderate degree of interspersion			3 pts	
Wetland has a low degree of interspersion			1 pt	
Wetland has no interspersion			0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
	10 acres to <25 acres	4 pts	
Actual Wetland Size Estimate: _____ acres	3 acres to <10 acres	3 pts	
	0.3 acre to <3 acres	2 pts	
Wetland area proposed to be impacted: _____ %	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area				0 pts		
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

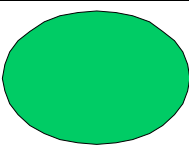
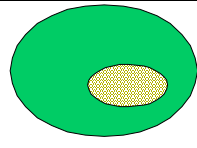
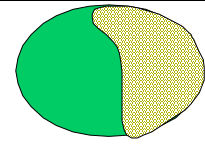
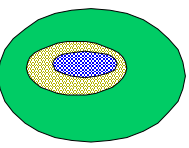
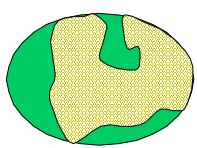
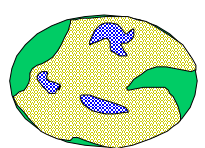
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.		
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)	3 pts
Seasonally Inundated	(12.5 – 25% of growing season)	2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)	1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																						
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <td style="width:10%;">Low</td> <td style="width:10%;">High</td> <td>Alteration</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <td style="width:10%;">Low</td> <td style="width:10%;">High</td> <td>Alteration</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																						
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

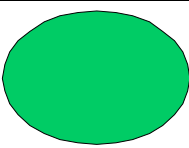
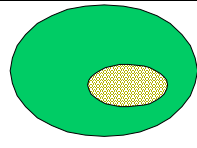
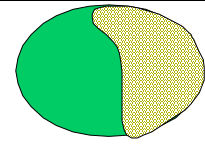
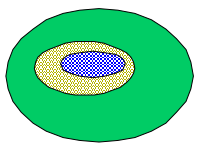
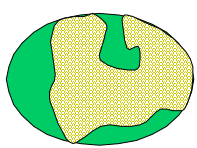
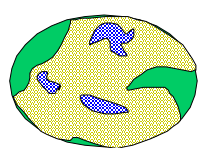
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table style="width:100%; border-collapse: collapse;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

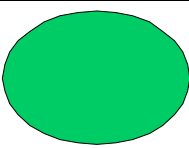
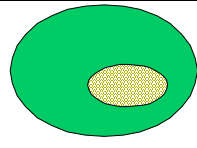
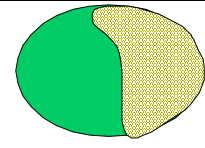
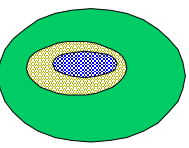
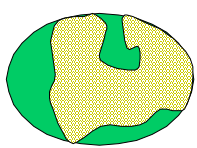
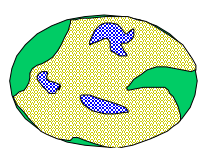
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution		9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use		12
Metric 3: Hydrology		29
Metric 4: Habitat Alteration and Habitat Structure Development		20
Metric 5: Special Situations		10
Metric 6: Vegetation, Interspersion, and Habitat Features		20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	<input type="checkbox"/> >50% of area is patch	4 pts	
	<input type="checkbox"/> <50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	<input type="checkbox"/> >25% of area is patch	2 pts	
	<input type="checkbox"/> <25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. “Dominant” is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area			0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

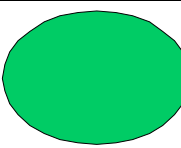
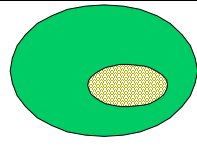
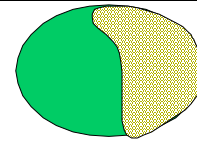
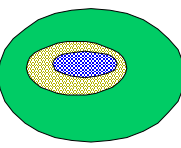
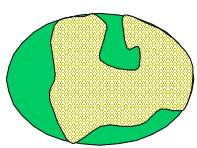
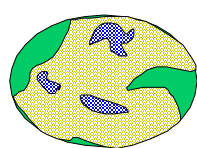
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland	3 pts		
6 to 20% of surrounding 2-mile radius is wetland	2 pts		
>20% of surrounding 2-mile radius is wetland	1 pt		

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.		
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).		
Low High Alteration	Low High Alteration	
<input type="checkbox"/> <input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> <input type="checkbox"/> stormwater inputs (addition of water)	
<input type="checkbox"/> <input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> <input type="checkbox"/> non-stormwater discharge(s)	
<input type="checkbox"/> <input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> <input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	
<input type="checkbox"/> <input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> <input type="checkbox"/> dredging activities in or near the wetland	
<input type="checkbox"/> <input type="checkbox"/> stream channelization	<input type="checkbox"/> <input type="checkbox"/> filling/grading activities in or near the wetland	
<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)	**only consider anthropogenic alterations (e.g. exclude beaver activity)	
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.		
No Hydrologic Alterations Apparent	9 pts	
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts	
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts	
Alterations are severely impacting the hydrology of the wetland.	1 pt	

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

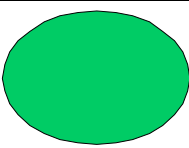
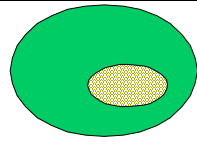
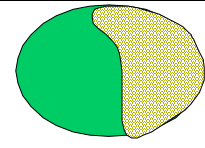
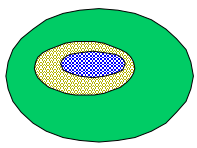
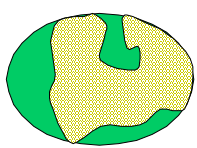
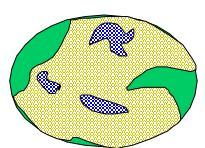
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass)
<input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed)	<input type="checkbox"/> <i>Myriophyllum aquaticum, M. spicatum</i> (parrotfeather and Eurasian watermilfoil)
<input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock)	<input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)*
<input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper)	<input type="checkbox"/> <i>Phragmites australis</i> (Common Reed)
<input type="checkbox"/> <i>Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii</i> (non-native <i>Lespedeza</i>)	<input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed)
<input type="checkbox"/> <i>Ligustrum sinense, L. vulgare</i> (Privet)	<input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn)
<input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle)	<input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose)
<input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle)	<input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)*
<input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> Other(s): specify below

Estimate the total coverage. Choose only 1 category.		Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt	
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts	
Low: 5% to <25% aerial coverage of invasive species	-1 pt	
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts	
Extensive: >75% aerial coverage of invasive species	-5 pts	

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

		Score
Wetland has a high degree of interspersion	5 pts	
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pts	

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	Invasive or non-native species dominate the coverage			0 pts			
	<25% of wetland area			0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

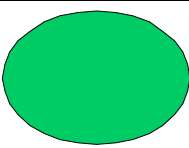
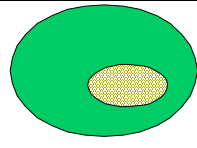
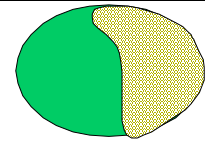
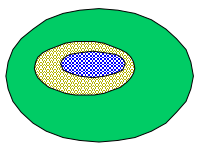
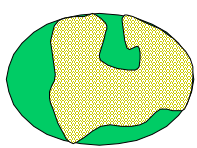
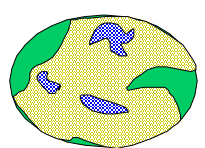
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input checked="" type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> single track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
<input type="checkbox"/>	<input type="checkbox"/>		ditch(es) in or near the wetland																																						
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																							
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

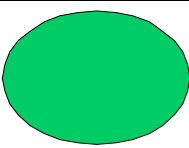
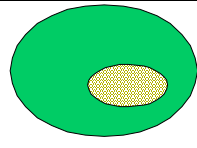
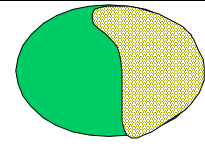
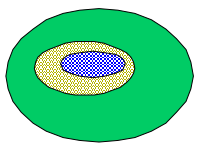
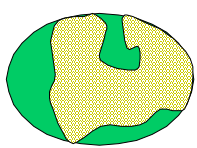
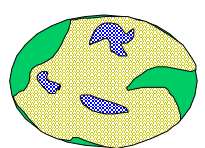
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundianacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?	YES	NO
Question 2: KSNPC Rare Wetland Community Type Present?	YES	NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?	YES	NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input checked="" type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch		4 pts
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)		2 pts
Up to 1000 ft.	>25% of area is patch		2 pts
	<25% of area is patch		0 pts

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.		Score																																							
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																									
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																									
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low		High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High		Alteration																																						
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<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland																																							
Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																									
No Hydrologic Alterations Apparent	9 pts																																								
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.	7 pts																																								
The wetland hydrology was altered but appears to retain some degree of functions.	3 pts																																								
Alterations are severely impacting the hydrology of the wetland.	1 pt																																								

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced erosion or exposure	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	human-induced sedimentation or burial	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging (includes excavating)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing, disking	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	intensive grazing (hooves)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	off-road vehicle use	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	large woody debris (LWD) removal	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grazing	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	rutting	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Herbicide or chemical treatment	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	nutrient enrichment, e.g., nuisance algae	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	sedimentation	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	dredging	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	filling/grading	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	plowing/disking/farming	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<input type="checkbox"/>
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

<p>Metric 5: Special Wetlands — Maximum of 10 pts. Check all that apply and score as indicated. Numbers in brackets [] indicate point values. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).</p>	
<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	<p>Score</p>
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	<p>Score</p>
<p>5c. Low-Quality Wetland Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	<p>Score</p>
<p>Metric 5 Total: add 5a – 5c (10 points max.)*</p>	<p>Subtotal</p>

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.							
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).							
Qualitative Cover Scoring Table							
Habitat component - Check all that apply →							
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts			
			Moderate to low native diversity	2 pts			
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt			
			Low native diversity	0 pts			
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts			
			Low native diversity	1 pt			
	<25% of wetland area	Invasive or non-native species dominate the coverage		0 pts			
				0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.							
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score			
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score			
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score			
6a. Vegetative Components Score							
Subtotal							

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

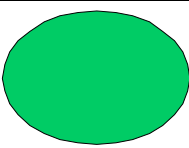
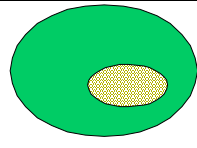
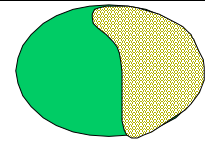
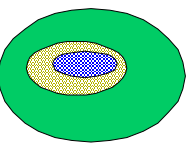
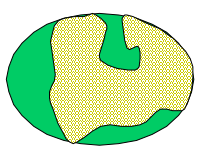
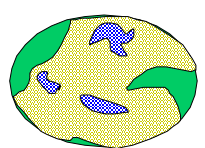
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

KY-WRAM Rating Form Version 3.0	<h1 style="text-align: center;">Kentucky Wetland Rapid Assessment Method (KY-WRAM)</h1> <p style="text-align: center;">Kentucky Division of Water</p>
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Instructions:

The Kentucky Wetland Rapid Assessment Method is intended for use as a tool for functional assessment. The method supplements, but does not replace information used in the existing regulatory process for wetlands, such as delineation. It is intended for use on all types of wetland in Kentucky. This is a rapid assessment method with combined field and office prep time (GIS) of no more than 8 hours. This method does not replace quantitative assessments such as Indices of Biotic Integrity.

The Rater is *STRONGLY URGED* to read the Guidance Manual for using the Kentucky Wetland Rapid Assessment Method (KY-WRAM) for further elaboration and discussion of the questions below prior to using the rating forms. It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the KY-WRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to the Scoring Boundary section in the Guidance Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

The KY-WRAM was developed by a Technical Working Group of state and federal agencies and Eastern Kentucky University. This method is modeled off of the Ohio Rapid Assessment Method (ORAM) with modifications influenced by North Carolina and Michigan's wetland rapid assessment methods.

The total score has been shown to be consistent year round; however, the ideal timeframe for use of this method is during the plant growing season when plant species can be reliably identified. It should be noted that the individual metrics may be scored differently between the seasons because certain metrics are easier to evaluate during the growing season (e.g., highly-invasive plant species coverage, special wetlands, vegetation components) and non-growing season (e.g., substrate/soil disturbance, hydrology).

Although the form may be filled out in a linear manner it is expected that the Rater will make note of wetland characteristics throughout the entire field evaluation. For example, alterations to the hydrology, substrate, or habitat, plant species encountered, and the amount of microtopography features present. This is an important step in evaluating the method properly.

Background Information

Name of wetland:
Date of evaluation:
Lat/Long coordinates: (decimal degrees)
County:
USACE/WQC Project ID:
Precipitation within the last 48 hours? Circle: Yes <input type="radio"/> No <input checked="" type="radio"/>

Evaluator name:
Phone number:
Email:
Evaluator affiliation and address:

<p>Attachments: Complete and check (v) each box</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attach map of wetland location. Use county road map or USGS 7.5 minute topographic map with location indicated. <input type="checkbox"/> Attach color photographs of wetland including landscape shot of entire wetland (if possible), vegetation components, habitat types, hydrologic features, and other relevant site features. <input type="checkbox"/> Attach prints of satellite imagery used for buffer and connectivity metrics. This should include multiple prints at appropriate scales. Prints should include labeled marks of the following: site location, Wetland Assessment Area, plant communities within the wetland, streams, 100 year floodplains, ponds, patches of open water, relevant upland features, and location of modification to wetland. Also include north arrow and scale of each print.
<p>Wetland Sketch (include north arrow, hydrologic features, plant communities and other habitat features)</p>
<p>Actual Wetland Size (indicate units):</p>
<p>Wetland Type (indicate NWI & HGM classifications):</p>

Background Information (continued)

Narrative Discussion: List any additional site information or features that may be relevant to evaluation of the wetland. See Guidance Manual for the types of information that should be included here. Scoring comments should be placed on page 13.

Narrative Rating

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat

- Is any part of the wetland located within the same HUC-12 watershed designated as Critical Habitat? (see Narrative Discussion) Yes No
- Does any federal (G1/G2) or state-listed T/E plant or animal species (S or S2) occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No
- Does any S3 (state species of concern) species occur within the wetland's HUC-12 watershed? (see Narrative Discussion) Yes No

2. Rare Wetland Community Type

- Does the wetland include a KSNPC rare wetland community? Yes No
- If YES, list the community type, the size of the rare community, and the percent of the wetland area.

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) Yes No

Comments:

Site:	Rater(s):	Date:
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Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.			Score
Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). Select one size class.			
Sources/assumptions for size estimate (list):	≥ 50 acres	6 pts	
	25 acres to <50 acres	5 pts	
Actual Wetland Size Estimate: _____ acres	10 acres to <25 acres	4 pts	
	3 acres to <10 acres	3 pts	
Wetland area proposed to be impacted: _____ %	0.3 acre to <3 acres	2 pts	
	0.1 to 0.3 acre	1 pts	
	< 0.1 acre	0 pts	

1b. Wetland Scarcity – Maximum 3 points.			Score
Use USFWS National Wetlands Inventory (NWI) maps, aerial imagery, and other information to estimate percentage of wetland area remaining within a 2-mile radius from the wetland’s center (use ArcGIS or by visual estimate). For this submetric, areas of open water within lakes, streams, rivers, and ponds (PUBX), etc. should be excluded. Select the most appropriate category below.			
0 to 5% of surrounding 2-mile radius is wetland		3 pts	
6 to 20% of surrounding 2-mile radius is wetland		2 pts	
>20% of surrounding 2-mile radius is wetland		1 pt	

Metric 1 Total: add 1a & 1b (9 points max.)	
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Wetland Size Estimate + Metric to English Conversion							
acres	hectare	feet ²	ft on side	yard ²	yd on side	m ²	m on side
50	20.2	2,177,983	1,476	241,998	492	202,000	449
25	10.1	1,088,992	1,044	120,999	348	101,000	318
10	4.1	435,596	660	48,340	220	41,000	203
3	1.2	130,679	362	14,520	121	12,000	110
0.3	0.12	13,067	114	1,452	38	1,200	35
0.1	0.04	4,356	66	484	22	400	20

Site:	Rater(s):	Date:
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Metric 2. Buffers and Intensity of Surrounding Land Use – Maximum 12 points.

****Use color maps for all metric 2 sub-metrics.**

2a. Average Buffer Width around the Wetland’s Perimeter – Maximum 4 points.			
Draw the cardinal and ordinal lines from the centroid of the wetland and calculate average buffer width. Select only one score.			
Buffers Include:	Non-Buffers Include:		
<input type="checkbox"/> shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars <input type="checkbox"/> abandoned row crop field (vegetated & naturalizing) <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> lightly managed forest (selectively logged) <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> other wetland, lake, or river <input type="checkbox"/> Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	<input type="checkbox"/> lawns, golf courses, manicured parkland <input type="checkbox"/> residential, commercial, industrial <input type="checkbox"/> roadways (including shoulders), parking lots <input type="checkbox"/> railroad tracks/beds <input checked="" type="checkbox"/> active agriculture: row crop field <input type="checkbox"/> conservation tillage, grazed pasture, utility right-of ways <input type="checkbox"/> clear-cutting or heavily managed forest, mining, construction activity <input type="checkbox"/> gravel or double-track dirt roads (includes ATV trails)		Score
Wide Buffer Width: 150 feet around the perimeter		4 pts	
Medium Buffer Width: 75 to <150 feet around the perimeter		3 pts	
Narrow Buffer Width: 25 to <75 feet around the perimeter		2 pts	
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter		0 pts	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland – Maximum 4 points.			
If a land use type is not listed, use the examples below to determine the category. Write in additional land use types here and indicate the land use category you assigned:			
Land Use Category	Estimate the percent coverage <u>comprised by each of the four categories</u> of land use below. Sum the points from all dominant land use categories (i.e., dominant is ≥25% total per category) and then average the score.		
	Land Use Types:	Estimate % of each category here ↓	Score
Very Low:	<input type="checkbox"/> mature growth forest <input type="checkbox"/> other wetland, lake, stream, river <input checked="" type="checkbox"/> shrubland/young forest <input type="checkbox"/> old field <input type="checkbox"/> hay field (non-row crop) <input type="checkbox"/> single track and two track dirt roads <input type="checkbox"/> lightly managed parkland <input type="checkbox"/> one-lane paved road		4 pts
Low:	<input type="checkbox"/> residential & lawns <input type="checkbox"/> conservation tillage <input type="checkbox"/> manicured parkland <input type="checkbox"/> recent logging and clear-cut (<5 years) <input type="checkbox"/> golf course <input type="checkbox"/> two-lane road <input type="checkbox"/> grazed pasture <input type="checkbox"/> railroad <input type="checkbox"/> utility right-of-way <input type="checkbox"/> man-made lake		2 pts
Moderately High:	<input type="checkbox"/> commercial, industrial <input type="checkbox"/> multi-lane paved roadway <input type="checkbox"/> high-density residential <input type="checkbox"/> construction activity <input type="checkbox"/> heavily grazed pasture <input type="checkbox"/> parking lot <input checked="" type="checkbox"/> row crop field <input type="checkbox"/> hazardous areas (mining, landfills, brownfields, etc.)		1 pts
High:			0 pts

For scores ending in 0.5, round up

2c. Connectivity to Other Natural Areas – Maximum 4 points.			
Use GIS with field adjustment if necessary. Evaluate the wetland’s connectivity to habitat patches in the greater landscape either contiguously or via a corridor (≥ 30 ft wide) of natural vegetation. Habitat patches and corridors must be natural <u>terrestrial</u> habitat (i.e., shrubland, forest, natural rock outcrops, cobble bars, wetlands, and etc.). Large streams and rivers, roads, and “non-natural” habitat such as grassland are barriers that end patches and corridors.			
Connected at:	Circle all categories that apply but report only the highest point value		Score
Up to 2500 ft. (can be more)	>50% of area is patch	4 pts	
	<50% of area is patch (<i>minimum patch size requirement = 10 acres</i>)	2 pts	
Up to 1000 ft.	>25% of area is patch	2 pts	
	<25% of area is patch	0 pts	

Metric 2 Total: add 2a – 2c (12 points max.)	Sub-total:
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Site:	Rater(s):	Date:
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Metric 3. Hydrology – Maximum of 29 points.

3a. Input of Water From an Outside Source – Maximum 10 points. Select all that apply.		Score
Surface Water: Inundation from a lake, pond, or stream overbank flow at least yearly (in a typical year)	4 pts	
Groundwater: Score only if you observe direct evidence of groundwater (e.g. including, but not limited to, a spring or seep)	4 pts	
Precipitation: All wetlands receive some portion of their hydrological budget from this	2 pt	

3b. Hydrological Connectivity – Maximum 6 points. Select all that apply.		Score
100-Year Floodplain or abutting a smaller stream/creek. As defined in FEMA maps or NRCS alluvial soil maps if FEMA maps are unavailable.	2 pts	
Between a Stream/Lake/Pond and Human Land Use. The wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the wetland before it discharges into the surface waterbody.	2 pts	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of <i>other</i> wetlands within 2500' of the assessment area boundary, with small areas of unmanicured/undeveloped vegetated uplands in between.	2 pts	

3c. Duration of Inundation/Saturation – Maximum 4 points.		Score	
Select the option(s) below that best describe(s) the dominant hydrologic characteristic of the wetland. "Dominant" is defined as comprising at least 25% of the wetland area. If separate areas have distinctly different hydrologic characteristics, select all that apply and average the points. Use US ACE hydrology indicators for assistance. Use NRCS growing season criteria to determine the growing season length for the county the wetland is in. If the wetland is in the NWI database, the Rater may consult the hydrology modifiers listed in the Classification Code for assistance.			
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)		4 pts
Regularly Inundated/ Saturated	(25 – 75% of growing season)		3 pts
Seasonally Inundated	(12.5 – 25% of growing season)		2 pts
Seasonally Saturated in the Upper 12 Inches of Soil	(12.5 – 25% of growing season)		1 pt

3d. Alterations to Natural Hydrologic Regime – Maximum 9 points.																																								
Evaluate the intactness of the natural hydrologic regime of the wetland. Check all forms of observed hydrologic alteration(s) that are potentially influencing the wetland (e.g. alteration may be outside of the wetland). Keep in mind that some alternations do not need to be actively maintained to have permanent negative effects.																																								
A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).																																								
<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>ditch(es) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>tile(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dike(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>weir(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stream channelization</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>other(s) (specify)</td> </tr> </table>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	tile(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dike(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	weir(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	stream channelization	<input type="checkbox"/>	<input type="checkbox"/>	other(s) (specify)	<table border="0" style="width:100%;"> <tr> <th align="left">Low</th> <th align="left">High</th> <th align="left">Alteration</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>stormwater inputs (addition of water)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>non-stormwater discharge(s)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>filling/grading activities in or near the wetland</td> </tr> </table> <p align="center">**only consider anthropogenic alterations (e.g. exclude beaver activity)</p>	Low	High	Alteration	<input type="checkbox"/>	<input type="checkbox"/>	stormwater inputs (addition of water)	<input type="checkbox"/>	<input type="checkbox"/>	non-stormwater discharge(s)	<input type="checkbox"/>	<input type="checkbox"/>	road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	dredging activities in or near the wetland	<input type="checkbox"/>	<input type="checkbox"/>	filling/grading activities in or near the wetland
Low	High	Alteration																																						
<input type="checkbox"/>	<input type="checkbox"/>	ditch(es) in or near the wetland																																						
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Select an option below that best describes the extent of wetland hydrology alteration. You may select adjoining options and average the points when appropriate.																																								
		Score																																						
No Hydrologic Alterations Apparent		9 pts																																						
The wetland hydrology appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level.		7 pts																																						
The wetland hydrology was altered but appears to retain some degree of functions.		3 pts																																						
Alterations are severely impacting the hydrology of the wetland.		1 pt																																						

Metric 3 Total: add 3a – 3d (29 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 4. Habitat Alteration and Habitat Structure Development – Maximum 20 Points.

*** A substrate or habitat disturbance may also negatively impact hydrology (Submetric 3d) and substrate/habitat (Submetric 4a/4b).*

4a. Substrate/Soil Disturbance – Maximum 4 points.			
Evaluate whether a physical disturbance has occurred to the soil and surface substrates of the wetland. Check all possible forms of observed substrate/soil disturbances within the wetland below.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	filling	<input type="checkbox"/> <input type="checkbox"/> human-induced erosion or exposure
<input type="checkbox"/>	<input type="checkbox"/>	grading	<input type="checkbox"/> <input type="checkbox"/> human-induced sedimentation or burial
<input type="checkbox"/>	<input type="checkbox"/>	logging	<input type="checkbox"/> <input type="checkbox"/> dredging (includes excavating)
<input type="checkbox"/>	<input type="checkbox"/>	construction	<input type="checkbox"/> <input type="checkbox"/> vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing, disking
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> intensive grazing (hooves)
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> off-road vehicle use
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland soil alteration. You may select adjoining options and average the points when appropriate.			Score
No Substrate or Soil Disturbance Apparent			4 pts
The wetland substrate or soil appears to have been altered, but the wetland was resilient to alterations			3 pts
The wetland substrate or soil was altered but was somewhat resilient to alterations			2 pts
The wetland substrate or soil was altered and was not resilient to alterations			1 pt

4b. Habitat Alteration – Maximum 9 points.			
Evaluate the intactness of the natural habitat and check all possible observed habitat alterations within the wetland below.			
Utilize aerial photography and field evidence to determine if any habitat alteration has occurred. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes (e.g., large woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc.). Disregard changes attributable to wetland community succession or other natural processes.			
Low	High	Alteration	
<input type="checkbox"/>	<input type="checkbox"/>	barriers (e.g. road bed(s)/RR grades(s))	<input type="checkbox"/> <input type="checkbox"/> large woody debris (LWD) removal
<input type="checkbox"/>	<input type="checkbox"/>	tree plantation	<input type="checkbox"/> <input type="checkbox"/> grazing
<input type="checkbox"/>	<input type="checkbox"/>	selective cutting	<input type="checkbox"/> <input type="checkbox"/> rutting
<input type="checkbox"/>	<input type="checkbox"/>	clearcutting	<input type="checkbox"/> <input type="checkbox"/> Herbicide or chemical treatment
<input type="checkbox"/>	<input type="checkbox"/>	mowing or shrub removal	<input type="checkbox"/> <input type="checkbox"/> nutrient enrichment, e.g., nuisance algae
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> sedimentation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> dredging
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> filling/grading
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> plowing/disking/farming
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> other(s) (specify)
Select an option below that best describes the extent of wetland habitat alteration. You may select adjoining options and average the points when appropriate.			Score
No Habitat Alterations Apparent			9 pts
The wetland habitat appears to have been altered, but the wetland was resilient to alterations and the functions are intact or near optimal level			7 pts
The wetland habitat was altered but appears to retain some degree of functions			3 pts
The alterations are severely limiting habitat function of the wetland			1 pt

4c. Habitat Reference Comparison – Maximum 7 points.			
Determine an overall qualitative rating of the wetland habitat quality in comparison to the best of its type remaining (i.e., any ecologically and/or hydrogeomorphically similar wetland habitat). Do not consider the best example for an area (i.e., compare, for example, emergent riverine wetlands to other emergent riverine wetlands). For instances where there is a clear distinction between wetland areas in terms of habitat structure development, the Rater may double-check non-adjoining options, but justification is required. See Guidance Manual for additional assistance.			
Select an option below that best describes the wetland habitat structure development. If unclear which of two options is more appropriate, select adjoining options and average the points.			Score
Excellent:	Wetland appears to represent the best of its type.		7 pts
Good:	Wetland appears to be a good example of its type		5 pts
Fair:	Wetland appears to be a fair example of its type.		3 pts
Poor:	Wetland is a poor example of its type		1 pt

Metric 4 Total: add 4a – 4c (20 points max.)	Subtotal
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Site:	Rater(s):	Date:
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Metric 5: Special Wetlands — Maximum of 10 pts.

Metric 5: Special Wetlands — Maximum of 10 pts.

Check all that apply and score as indicated.

Numbers in brackets [] indicate point values.

Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

<p>5a. Regulatory Protection / Critical Habitat</p> <ul style="list-style-type: none"> <input type="checkbox"/> Known occurrence of federally threatened/endangered species or designated critical habitat within a HUC-12 watershed [10]. <input type="checkbox"/> Known occurrence of other rare species with state rank S1 *[10], S2 *[5], S3*[3]; *use higher rank if there are mixed ranks or qualifiers (i.e., S1/S2 [10] and S2/S3 [5]). Exclude records which are only “historic” (i.e., surveys have documented that the species is no longer there) within HUC-12 watershed. 	Score
<p>5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appalachian seep/bog (S1S2) [8] <input type="checkbox"/> Bottomland marsh (S1S2) [8] <input type="checkbox"/> Bottomland slough OR Coastal Plain Slough (S2) [5] <input type="checkbox"/> Calcareous seep/bog (S1) [10] <input type="checkbox"/> Coastal Plain forested acid seep (S1) [10] <input type="checkbox"/> Cypress (tupelo) swamp (S1) [10] <input type="checkbox"/> Sinkhole/depression marsh (S1S2) [8] <input type="checkbox"/> Sinkhole/depression pond (S2) [5] <input type="checkbox"/> Wet depression/sinkhole forest (S1S2) [8] <input type="checkbox"/> Wet bottomland hardwood forest (S2) [5] <input type="checkbox"/> Wet meadow (S1) [10] <input type="checkbox"/> Wet prairie (S1) [10] 	Score
<p>5c. Low-Quality Wetland</p> <p>Check all that apply, but maximum score is -10 points:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wetland is < 1 acre and has >75% cover of invasive plants [-10] <input type="checkbox"/> Wetland is <1 acre and is nonvegetated mined/excavated land [-10] <input type="checkbox"/> Wetland is <1 acre and is a constructed stormwater treatment pond [-10] 	Score
Metric 5 Total: add 5a – 5c (10 points max.)*	Subtotal

*Score can be negative

Site:	Rater(s):	Date:
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Metric 6. Vegetation, Interspersion, and Habitat Features – Maximum 20 points.

****For each Metric 6 sub-metric, do NOT consider the wetland type being assessed, especially for plant species diversity in 6a.**

6a. Wetland Vegetation Components – Maximum 9 points.								
Determine the Qualitative Cover Score of each Vegetation Component. Using the Scoring Table below, start on the left and proceed to the right, until a point value is obtained for each Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include lone trees, shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c for list of Kentucky’s most invasive wetland species. Check the box on the right to indicate how the score was determined for each Vegetation Component (i.e., F, S or H).								
Qualitative Cover Scoring Table								
Habitat component - Check all that apply →								
Vegetation Component is >0.1 acre	>25% of wetland area	Native species dominate the coverage	High native diversity	3 pts				
			Moderate to low native diversity	2 pts				
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt				
			Low native diversity	0 pts				
Vegetation Component is <0.1 acre	>25% of wetland area	Native species dominate the coverage	Moderate to high native diversity	2 pts				
			Low native diversity	1 pt				
	<25% of wetland area	Invasive or non-native species dominate the coverage			0 pts			
					0 pts			
Write in “absent” (don’t score it a zero) if habitat is not present.								
Forest Overstory Component (F) – Maximum 3 points. Qualitative cover score derived from table. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height.				Score				
Shrub/Sapling Component (S) – Maximum 3 points. Qualitative cover score derived from table. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees.				Score				
Herbaceous Component (H) – Maximum 3 points. Qualitative cover score derived from table. Herbaceous wetland areas are dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. This component includes the robust-stemmed yellow pond lily (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>). All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).				Score				
6a. Vegetative Components Score								
Subtotal								

Site:	Rater(s):	Date:
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6b. Open Water, Mudflat, and Aquatic Bed Habitats – Maximum 3 points.
 Open water is an unobstructed, inundated area of water with few or no rooted emergent or non-tree woody plant species. For KY-WRAM, mudflats are considered areas with exposed mud substrate with little to no vegetation. This metric is designed to evaluate habitat for waterfowl, shorebirds, fish, and other wildlife.

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds (including farm ponds), streams and/or their floodwaters, pools, saturated sandbars, or other natural or constructed waters**
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life. This includes the “understory” below a forest canopy.
- **Aquatic bed areas** (submerged aquatic vegetation). Aquatic bed is dominated by plants growing at or below the surface of the water for most of the growing season in most years. The KY-WRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the KY-WRAM, all floating-leaf aquatic taxa (e.g. water lilies, *Nymphaea* spp.), are included in the definition of aquatic bed (therefore, are included in the definition of open water).
- **100-foot wide strip of open water along a lake or river** (see Wetland Assessment Area guidelines in the *Guidance Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see KY-WRAM Wetland Assessment Area Boundary Guidelines). Divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake’s open water included within the Wetland would be calculated as: 200/400 = 0.5 acre. Open water ends where water depth is > 6.6 ft; the Rater may use depth charts to establish this, when available.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).
- The Indicators below are intended to provide guidance to determine if open water was present **when the wetland is currently dry.**
 - If the wetland is currently dry, use the appropriate USACE Wetland Delineation Regional Supplement to determine if indicators of open water are present (appropriate indicators are listed below).
 - One primary indicator OR two secondary indicators must be present to consider presence of open water. In the section indicated below, describe how you used indicators to determine your score.

Surface Water Present? **Yes** – How much? Score below **No** – Use indicators below, then assign score

Estimate the total coverage. Choose only 1 category.			Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pts	

Open Water Hydrology Indicators – Information in parentheses represents US ACE Wetland Delineation Regional Supplement Hydrology Indicators that should be consulted for indicators of open water for the purposes of KY-WRAM.

Check indicators present below:

Primary Indicators (must have 1) <input type="checkbox"/> Surface Water present on aerial imagery (A1) <input type="checkbox"/> Water marks (B1) <input type="checkbox"/> Inundation Visible of Aerial Imagery (B7) <input type="checkbox"/> Algal mat or crust (B4) <input type="checkbox"/> Presence of aquatic fauna (B13) <input type="checkbox"/> Presence of true aquatic plants (B14)	OR →	Secondary Indicators (must have 2) <input type="checkbox"/> Sparsely vegetated concave surface (B8) <input type="checkbox"/> Drainage patterns (B10) <input type="checkbox"/> Moss trim lines (B16) <input type="checkbox"/> Geomorphic position (D2)
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Describe here how indicators were used to determine score:

Subtotal

Site:	Rater(s):	Date:
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6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
 Estimate the combined total coverage of **any** invasive species present in the wetland.

Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
 (Print the complete KY-EPPC list and take into the field)

*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

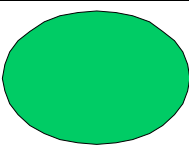
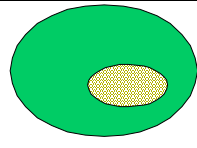
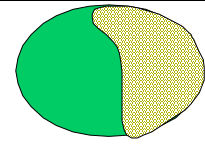
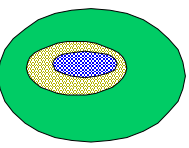
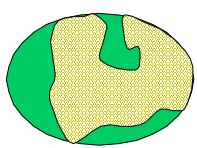
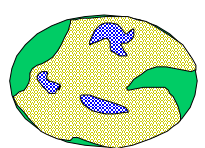
<input type="checkbox"/> <i>Alliaria petiolata</i> (Garlic Mustard) <input type="checkbox"/> <i>Alternanthera philoxeroides</i> (Alligator Weed) <input type="checkbox"/> <i>Conium maculatum</i> (Poison Hemlock) <input type="checkbox"/> <i>Euonymus fortunei</i> (Winter Creeper) <input type="checkbox"/> <i>Lespedeza cuneata</i> , <i>L. bicolor</i> , <i>L. stipulacea</i> , <i>L. striata</i> , <i>L. thunbergii</i> (non-native <i>Lespedeza</i>) <input type="checkbox"/> <i>Ligustrum sinense</i> , <i>L. vulgare</i> (Privet) <input type="checkbox"/> <i>Lonicera japonica</i> (Japanese Honeysuckle) <input type="checkbox"/> <i>Lonicera maackii</i> (Bush Honeysuckle) <input type="checkbox"/> <i>Lythrum salicaria</i> (Purple Loosestrife)	<input type="checkbox"/> <i>Microstegium vimineum</i> (Japanese Stilt Grass) <input type="checkbox"/> <i>Myriophyllum aquaticum</i> , <i>M. spicatum</i> (parrotfeather and Eurasian watermilfoil) <input type="checkbox"/> <i>Phalaris arundinacea</i> (Reed Canary Grass)* <input type="checkbox"/> <i>Phragmites australis</i> (Common Reed) <input type="checkbox"/> <i>Polygonum cuspidatum</i> (Japanese knotweed) <input type="checkbox"/> <i>Rhamnus cathartica</i> (Common Buckthorn) <input type="checkbox"/> <i>Rosa multiflora</i> (Multiflora Rose) <input type="checkbox"/> <i>Typha ssp.</i> (Cattail species)* <input type="checkbox"/> Other(s): specify below
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Estimate the total coverage. Choose only 1 category.	Score
Virtually Absent: <1% aerial coverage of invasive species	1 pt
Nearly Absent: 1% to <5% aerial coverage of invasive species	0 pts
Low: 5% to <25% aerial coverage of invasive species	-1 pt
Moderate: 25% to <75% aerial coverage of invasive species	-3 pts
Extensive: >75% aerial coverage of invasive species	-5 pts

Additional invasive plant species present (list here):

6d. Horizontal (plan view) Interspersion – Maximum 5 points

Evaluate the wetland from a “plan view,” i.e., imagine as if you are hovering above the wetland looking down upon it. The figure shows hypothetical wetlands for estimating the amount of habitat interspersion including growing season vegetation communities and open water. Only include open water that is 6.6 feet deep or less and does not include inundated areas below herbaceous and shrub vegetation. If unclear, select **adjoining** options and average the points.

		
NONE	LOW	LOW
		
MODERATE	MODERATE	HIGH

Wetland has a high degree of interspersion	Score
Wetland has a high degree of interspersion	5 pts
Wetland has a moderate degree of interspersion	3 pts
Wetland has a low degree of interspersion	1 pt
Wetland has no interspersion	0 pts

Subtotal

Site:	Rater(s):	Date:
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6e. Microtopographic Features – Maximum 12 points (i.e., 3 points per feature). Choose only one category for each.				
1. Hummocks/Tussocks/Tree Mounds , e.g., sedge/grass tussocks, decayed nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of the wetland and includes the depressional matrix within any group of raised features.				Score
Absent: 0 pt No features present	Low: 1 pt Present but <1% of the area	Moderate: 2 pts 1% to 5% of the area	High: 3 pts >5% of the area	
2. Large Woody Debris (LWD) . per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)				Score
Virtually Absent: 0 pt < 1 per acre	Low: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	High: 3 pts >10 per acre	
3. Large Snags (≥12 inches DBH) .				Score
Absent: 0 pt No snags present	Low: 1 pt Present but <1 per acre	Moderate: 2 pts 1 to 5 per acre	High: 3 pts >5 per acre	
4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat (see Manual for description of habitat quality).				Score
Virtually Absent: 0 pt < 5% of the area	Low: 1 pt Present in small amounts (5% to 10% of the area) but of low to moderate quality	Moderate: 2 pts Present in moderate or greater amounts (>10% of the area) but of low to moderate quality OR Present in small amounts (5% to 10% of the area) but of highest quality	High: 3 pts Present in moderate or greater amounts (>10% of the area) and of highest quality	
6e. Microtopographic Features Score				

Metric 6 Total: add 6a – 6e (20 points max.)	Total Score
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KY-WRAM Summary

Narrative Rating		Circle One
Question 1: USFWS Critical Habitat, Federal T/E Species, or State-ranked (S1, S2, or S3) species present?		YES NO
Question 2: KSNPC Rare Wetland Community Type Present?		YES NO
Question 3: Wetland has Scenic, Cultural, or Recreational Value?		YES NO
Quantitative Rating	Score	Maximum
Metric 1: Wetland Size and Distribution	_____	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	_____	12
Metric 3: Hydrology	_____	29
Metric 4: Habitat Alteration and Habitat Structure Development	_____	20
Metric 5: Special Situations	_____	10
Metric 6: Vegetation, Interspersion, and Habitat Features	_____	20
Total Score =		100 pts. Max.

Site:	Rater(s):	Date:
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Scoring Comments:

HGM definitions:

RIVERINE: Occur in flood plains and riparian corridors in association with stream channels of any flow regime. Dominant water sources are overbank flow or subsurface hydraulic connections.

DEPRESSIONAL: Occur in topographic depressions. Dominant water sources are precipitation, ground water discharge, and water from adjacent uplands. Water moves vertically.

SLOPE: Occur where there is a discharge of ground water to the land surface. Normally occur on sloping land; gradient may be slight to steep. Water does not pool but flows downslope in one direction.

FLAT: Occur most commonly on historic flood plain terraces – where the channel has incised so deeply that it rarely or never floods onto the flood plain. Main source of water is precipitation, and they have poor vertical drainage. They receive no groundwater discharge, which distinguishes them from depressional and slope wetlands.

Caldwell Solar, Caldwell County,
Kentucky

APPENDIX

E

STREAM FORMS

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s001		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess		DATE: 4/6/2020	TIME Start: 13:32
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	$\frac{12}{}$ ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	$\frac{1}{}$ ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	$\frac{44}{}$ m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
$\frac{0}{}$ Riffle $\frac{0}{}$ Run $\frac{0}{}$ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata $\frac{0}{}$ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF Seine	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle $\frac{20}{}$ %	Run $\frac{60}{}$ %	Pool $\frac{20}{}$ %
			Reach Total
Silt/Clay (<0.06 mm)			0
Sand (0.06 – 2 mm)			5
Gravel (2-64 mm)			10
Cobble (64 – 256 mm)			30
Boulders (>256 mm)			50
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold; font-size: 1.2em;">16</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold; font-size: 1.2em;">1</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold; font-size: 1.2em;">8</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold; font-size: 1.2em;">2</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold; font-size: 1.2em;">16</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold; font-size: 1.2em;">3</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

96

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s002		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 4/6/2020	TIME Start: 14:40
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A		TIME (24hr)	Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Now <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Past 24 hours Heavy rain Steady rain Intermittent showers Clear/sunny Cloudy	<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential
		<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops	<input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width <u>15</u> ft	Maximum Depth <u>0.66</u> ft	<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:	<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal
Reach Length <u>203</u> m	Riffle/Run/Pool Sequence (No. Sampled in Reach) <u>1</u> Riffle <u>1</u> Run <u>1</u> Pool		RIPARIAN VEGETATION
			Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa
P-CHEM		CHANNEL ALTERATIONS	
Instrument Used: _____ Date Calibrated: _____		<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF Seine	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)		
Tissue:	No. of Samples collected _____ Sp:	Lead Collector: _____	
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %
	Reach Total		
Silt/Clay (<0.06 mm)			0
Sand (0.06 – 2 mm)			5
Gravel (2-64 mm)			10
Cobble (64 – 256 mm)			20
Boulders (>256 mm)			55
Bedrock			10

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">0</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">0</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">20</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">3</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 9 ----- RB 9	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

91

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s003			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops		
INSTREAM FEATURES Stream Width <u>50</u> ft Maximum Depth <u>1.33</u> ft Reach Length <u>874</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool			HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal
			RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment			Lead Collector: _____		
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine			Lead Collector: _____		
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:			Lead Collector: _____		
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:			Lead Collector: _____		
<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp:			Lead Collector: _____		
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg			Lead Collector: _____		
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				20	
Sand (0.06 – 2 mm)				5	
Gravel (2-64 mm)				25	
Cobble (64 – 256 mm)				30	
Boulders (>256 mm)				10	
Bedrock				5	

NOTES/COMMENTS:

SITE NOT SAMPLED:	
<input type="checkbox"/> Land owner denial	<input type="checkbox"/> Dry <input type="checkbox"/> Too deep/Impounded
<input type="checkbox"/> Site not found/Secluded	<input type="checkbox"/> Unsafe
<input type="checkbox"/> Other (indicate under comments)	

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal				Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 10	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Pool Substrate Characterization Score 11	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.				Hard-pan clay or bedrock; no root mat or vegetation.						
3. Pool Variability 3	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.						
4. Sediment Deposition Score 10	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status Score 1	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.				Very little water in channel and mostly present as standing pools.						
6. Channel Alteration Score 20	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.				Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.						
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.				Channel straight; waterway has been channelized for a long distance.						
8. Bank Stability LB 3 ----- RB 3	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.				Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars						
9. Vegetative Protection LB 10 ----- RB 10	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.				Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.				Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.						

Total Score

106

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s004			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 13:10 (24hr) Finish:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					
Reach			CANOPY COVER::		STREAM TYPE:
Station	Downstream	Upstream	<input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input checked="" type="checkbox"/> Fully Shaded (75-100%)		<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent
LAT					
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential <input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.08</u> ft Reach Length <u>100</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector:			<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)		
Tissue: No. of Samples collected _____ Sp: Lead Collector:					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector:			<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				15	
Sand (0.06 – 2 mm)				15	
Gravel (2-64 mm)				5	
Cobble (64 – 256 mm)				5	
Boulders (>256 mm)				35	
Bedrock				20	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover 6 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness 12 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime 1 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition 13 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status 0 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration 20 Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) 5 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

103

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s005			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 13:34
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Now Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy		
			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Silviculture <input type="checkbox"/> Residential <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.25</u> ft Reach Length <u>35</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: <input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: Lead Collector:					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				65	
Sand (0.06 – 2 mm)				5	
Gravel (2-64 mm)				20	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover Score 1	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness Score 9	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime Score 1	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition Score 6	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status Score 2	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration Score 18	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) Score 10	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank LB 5 ----- RB 5	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 10 ----- RB 10	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

97

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s006		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 4/7/2020	TIME Start: 13:58
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A		TIME (24hr)	Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>2</u> ft	<input type="checkbox"/> Dams	<input checked="" type="checkbox"/> Dry
Maximum Depth	<u>0.08</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>110</u> m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous
			<input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	%Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF Seine	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %
			Reach Total
Silt/Clay (<0.06 mm)			70
Sand (0.06 – 2 mm)			5
Gravel (2-64 mm)			10
Cobble (64 – 256 mm)			10
Boulders (>256 mm)			5
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover Score 1	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness Score 8	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime Score 1	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status Score 2	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration Score 18	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) Score 4	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank LB 2 ----- RB 2	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 2 ----- RB 2	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 10 ----- RB 10	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

83

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s007		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess		DATE: 4/7/2020	TIME Start: 14:05 Finish:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential	
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>		<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers	
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.25</u> ft Reach Length <u>77</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:	STREAM FLOW <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector:
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF Seine	Lead Collector:
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector:
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector:
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector:
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector:
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %
Silt/Clay (<0.06 mm)			80
Sand (0.06 – 2 mm)			0
Gravel (2-64 mm)			10
Cobble (64 – 256 mm)			5
Boulders (>256 mm)			5
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover Score 1	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness Score 8	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime Score 1	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status Score 2	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration Score 18	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) Score 4	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank LB 2 ----- RB 2	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 2 ----- RB 2	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 10 ----- RB 10	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

83

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s008			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 14:55
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Reach			CANOPY COVER::		STREAM TYPE:
Station Downstream Upstream			<input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input checked="" type="checkbox"/> Fully Shaded (75-100%)		<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent
LAT					
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers <input type="checkbox"/> Residential		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.58</u> ft Reach Length <u>91</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
			RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector:					
		<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)			
Tissue: No. of Samples collected _____ Sp: Lead Collector:					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector:					
		<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:			
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				50	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				5	
Bedrock				20	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">16</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">1</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">19</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 4 ----- RB 4	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 10 ----- RB 10	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

111

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s009			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 15:55
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width $\frac{3}{\quad}$ ft Maximum Depth $\frac{0.17}{\quad}$ ft Reach Length $\frac{37}{\quad}$ m Riffle/Run/Pool Sequence (No. Sampled in Reach) _____ Riffle _____ Run _____ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
			RIPARIAN VEGETATION		
			Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata _____ Dom. Tree/Shrub Taxa		
			CHANNEL ALTERATIONS		
			<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)		
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				45	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				25	
Boulders (>256 mm)				15	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">1</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">19</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">4</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

87

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s010			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 17:19
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Now Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy		
			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Silviculture <input type="checkbox"/> Residential <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.33</u> ft Reach Length <u>194</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: <input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: Lead Collector:					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				35	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				25	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				20	
Bedrock				5	

NOTES/COMMENTS:

SITE NOT SAMPLED:

Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 2em; font-weight: bold;">2</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 2em; font-weight: bold;">6</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 2em; font-weight: bold;">1</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 2em; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 2em; font-weight: bold;">2</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 2em; font-weight: bold;">19</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 2em; font-weight: bold;">4</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-size: 2em; font-weight: bold;">2</div> ----- RB <div style="text-align: right; font-size: 2em; font-weight: bold;">2</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-size: 2em; font-weight: bold;">10</div> ----- RB <div style="text-align: right; font-size: 2em; font-weight: bold;">10</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 2em; font-weight: bold;">10</div> ----- RB <div style="text-align: right; font-size: 2em; font-weight: bold;">10</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

83

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s011			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess			DATE: 4/7/2020		TIME Start: 17:18
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Now Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy		
			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Silviculture <input type="checkbox"/> Residential <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.08</u> ft Reach Length <u>51</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: <input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: Lead Collector:					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				20	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				30	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				20	
Bedrock				0	

NOTES/COMMENTS:

<p>SITE NOT SAMPLED:</p> <p><input type="checkbox"/> Land owner denial <input type="checkbox"/> Dry <input type="checkbox"/> Too deep/Impounded</p> <p><input type="checkbox"/> Site not found/Secluded <input type="checkbox"/> Unsafe</p> <p><input type="checkbox"/> Other (indicate under comments)</p>

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold; font-size: 1.2em;">2</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold; font-size: 1.2em;">1</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold; font-size: 1.2em;">2</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold; font-size: 1.2em;">19</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold; font-size: 1.2em;">4</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">2</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">2</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

83

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s101			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 4/6/2020		TIME Start: 15:36
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>8</u> ft Maximum Depth <u>0.66</u> ft Reach Length <u>64</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				60	
Sand (0.06 – 2 mm)				5	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				20	
Boulders (>256 mm)				5	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 7	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 2	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 4	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 1	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 0	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 7 RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 3 RB 3	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 0 RB 0	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

50

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s102		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Crystal Renskers		DATE: 4/7/2020	TIME Start: 13:42
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A		TIME (24hr)	Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours		
Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy	<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential	<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops
		<input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers	
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width <u>1.5</u> ft		<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth <u>0.33</u> ft		<input type="checkbox"/> Bridge Abutments	<input checked="" type="checkbox"/> Pooled
Reach Length <u>259</u> m		<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
		RIPARIAN VEGETATION	
		Dominate Type: <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs	
		Number of strata <u> </u> Dom. Tree/Shrub Taxa	
		CHANNEL ALTERATIONS	
		<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector:
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF Seine	Lead Collector:
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector:
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector:
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector:
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector:
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %
			Reach Total
Silt/Clay (<0.06 mm)			60
Sand (0.06 – 2 mm)			10
Gravel (2-64 mm)			5
Cobble (64 – 256 mm)			15
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter SCORE	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 6	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 11	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 14	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 16	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 9 ----- RB 9	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 7 ----- RB 7	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

112

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s103			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 4/7/2020		TIME Start: 15:53
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential <input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>2</u> ft Maximum Depth <u>0.25</u> ft Reach Length <u>39</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
RIPARIAN VEGETATION					
Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa					
CHANNEL ALTERATIONS					
<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)					
P-CHEM					
Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				72	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				5	
Boulders (>256 mm)				3	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 9	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 11	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 4	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 6	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 3	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 16	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 3	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 9 ----- RB 9	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

91

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s104			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Crystal Renskers			DATE: 4/7/2020		TIME Start: 16:32
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Reach					
Station		Downstream	Upstream		
LAT					CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input checked="" type="checkbox"/> Fully Shaded (75-100%)
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0</u> ft Reach Length <u>95</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: <input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: Lead Collector:					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				70	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 3	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness Score 0	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime Score 5	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition Score 4	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 4	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 20	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) Score 0	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 10 ----- RB 10	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

86

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s105		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM: PROJECT:
INVESTIGATORS: Crystal Renskers		DATE: 4/8/2020	TIME Start: 12:02
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential	
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>		<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops	
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.33</u> ft Reach Length <u>51</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers	
HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector:			
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector:			
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector:			
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: <input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)			
Tissue: No. of Samples collected _____ Sp: Lead Collector:			
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:			
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %
Silt/Clay (<0.06 mm)			65
Sand (0.06 – 2 mm)			0
Gravel (2-64 mm)			0
Cobble (64 – 256 mm)			5
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">4</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold;">5</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">5</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">4</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">4</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold;">20</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">4</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 10 ----- RB 10	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 4 ----- RB 4	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

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Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s201			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM: PROJECT:
INVESTIGATORS: Kaitlin Hillier			DATE: 4/7/2020		TIME Start: 12:31 Finish:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					
Station			Reach		
			Downstream		Upstream
LAT	37.143974				
LONG	-87.978880				
			CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input checked="" type="checkbox"/> Fully Shaded (75-100%)		STREAM TYPE: <input type="checkbox"/> Perennial <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Now: <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy Past 24 hours: <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential <input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>7</u> ft Maximum Depth <u>0.5</u> ft Reach Length <u>158</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata <u>2</u> Dom. Tree/Shrub Taxa sycamore, hackberry		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____ Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment		Lead Collector: _____			
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine		Lead Collector: _____			
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____			
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____			
		<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)			
Tissue: No. of Samples collected _____ Sp:		Lead Collector: _____			
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____			
		<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:			
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				50	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				40	
Cobble (64 – 256 mm)				5	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 3	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 6	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 7	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 4	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 11	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 16	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 4 ----- RB 4	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 6 ----- RB 6	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

86

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s202		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Kaitlin Hillier		DATE: 4/7/2020	TIME Start: 15:38
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish: 16:15
Station		Reach	
	Downstream	Upstream	
LAT	37.143350		
LONG	87.987398		
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input checked="" type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>20</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>1</u> ft	<input type="checkbox"/> Bridge Abutments	<input checked="" type="checkbox"/> Pooled
Reach Length	<u>823</u> m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs
			Number of strata <u>3</u> Dom.
			Tree/Shrub Taxa
			sycamore, sugarberry
P-CHEM		Instrument Used: _____ Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	%Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF Seine	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %
			Reach Total
Silt/Clay (<0.06 mm)			5
Sand (0.06 – 2 mm)			20
Gravel (2-64 mm)			70
Cobble (64 – 256 mm)			5
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 0	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 3 Score 3	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 4	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 3	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 15	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 6	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 3 ----- RB 3	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 6	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

63

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s203			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Kaitlin Hillier			DATE: 4/7/2020		TIME Start: 16:55
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.140020				
LONG	-87.990335				
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input type="checkbox"/> <input type="checkbox"/> Steady rain <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Intermittent showers <input type="checkbox"/> <input type="checkbox"/> Clear/sunny <input type="checkbox"/> <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width $\frac{12}{}$ ft Maximum Depth $\frac{1}{}$ ft Reach Length $\frac{494}{}$ m Riffle/Run/Pool Sequence (No. Sampled in Reach) _____ Riffle _____ Run _____ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata <u>2</u> Dom. Tree/Shrub Taxa osage orange, sugarberry, black walnut	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF Seine Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				65	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				20	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

15% leaf pack/woody debris

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 0	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 6	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 2	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 6	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 1	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 14	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 4 ----- RB 4	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 6 ----- RB 6	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 3	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

62

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1001			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.124554				
LONG	-87.953934				
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops		
			<input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>3</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>237</u> m		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool				RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				30	
Sand (0.06 – 2 mm)				30	
Gravel (2-64 mm)				40	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">13</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">14</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">14</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

111

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1002			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME (24hr) Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.123759				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.950983				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>199</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				30	
Sand (0.06 – 2 mm)				25	
Gravel (2-64 mm)				40	
Cobble (64 – 256 mm)				5	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">13</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">14</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">9</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">9</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 6 ----- RB 6	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 5	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

108

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1003			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 5/25/2021		TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.120636				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.950141				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>272</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	Reach Total	
Silt/Clay (<0.06 mm)				30	
Sand (0.06 – 2 mm)				25	
Gravel (2-64 mm)				40	
Cobble (64 – 256 mm)				5	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 8	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 10	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 6	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 10	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 10	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 10	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 8	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 3 ----- RB 3	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 4 ----- RB 4	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 4 ----- RB 4	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

84

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1004			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.120521				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.951834				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>123</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input checked="" type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ _____ %	Run ⁶⁰ _____ %	Pool ¹⁰ _____ %	Reach Total	
Silt/Clay (<0.06 mm)				40	
Sand (0.06 – 2 mm)				15	
Gravel (2-64 mm)				35	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">4</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 4 ----- RB 4	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 2 ----- RB 2	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 3 ----- RB 3	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

73

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1005		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			TIME (24hr) Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.132256		
LONG	-87.960708		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width ¹⁰ _____ ft		<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth ¹ _____ ft		<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length ⁴⁹⁸ _____ m		<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
_____ Riffle _____ Run _____ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata _____ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector:
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector:
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector:
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector:
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector:
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector:
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ¹⁰ _____ %	Run ⁶⁵ _____ %	Pool ²⁵ _____ %
			Reach Total
Silt/Clay (<0.06 mm)			35
Sand (0.06 – 2 mm)			15
Gravel (2-64 mm)			35
Cobble (64 – 256 mm)			10
Boulders (>256 mm)			0
Bedrock			20

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">16</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">13</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">11</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">8</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">15</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">13</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 8 ----- RB 8	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 7 ----- RB 7	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

132

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1006		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.132713		
LONG	-87.960282		
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>2</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.2</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>170</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ¹⁰ %	Pool ³⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			35
Sand (0.06 – 2 mm)			15
Gravel (2-64 mm)			35
Cobble (64 – 256 mm)			10
Boulders (>256 mm)			0
Bedrock			20

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">12</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">8</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">16</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">16</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 3 ----- RB 3	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 6 ----- RB 6	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

113

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1007		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.132152		
LONG	-87.958901		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>1</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.4</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>68</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁷⁰ %	Run ²⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			30
Sand (0.06 – 2 mm)			30
Gravel (2-64 mm)			40
Cobble (64 – 256 mm)			0
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 6	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 10	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 8 ----- RB 8	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

83

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1008		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.13272		
LONG	-87.960861		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	$\frac{1}{\quad}$ ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	$\frac{0.1}{\quad}$ ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	$\frac{138}{\quad}$ m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
____ Riffle ____ Run ____ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata ____ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector:
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector:
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector:
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector:
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector:
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector:
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁷⁰ %	Run ²⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			50
Sand (0.06 – 2 mm)			20
Gravel (2-64 mm)			30
Cobble (64 – 256 mm)			0
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 10	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 10	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 3 Score 10	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 3 ----- RB 3	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 10 ----- RB 10	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 10 ----- RB 10	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

95

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1009			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.136046				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.956854				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>4</u> ft Maximum Depth <u>0.4</u> ft Reach Length <u>143</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ²⁰ %	Pool ³⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				35	
Sand (0.06 – 2 mm)				20	
Gravel (2-64 mm)				35	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">11</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">12</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">11</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">10</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">12</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 6 ----- RB 6	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 6 ----- RB 6	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

117

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1010		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.132206		
LONG	-87.965785		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Industrial
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input checked="" type="checkbox"/> Row Crops
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Forest
	<input type="checkbox"/> Cloudy		<input type="checkbox"/> Pasture/Grazing
			<input type="checkbox"/> Silviculture
			<input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>1</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.1</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>157</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁷⁰ %	Run ¹⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			80
Sand (0.06 – 2 mm)			10
Gravel (2-64 mm)			10
Cobble (64 – 256 mm)			0
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 10	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 6	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 8	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 10	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 10	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 10	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 10	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 6 ----- RB 6	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 7 ----- RB 7	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 7 ----- RB 7	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

106

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1011		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.131959		
LONG	-87.96624		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Industrial
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input checked="" type="checkbox"/> Row Crops
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Forest
	<input type="checkbox"/> Cloudy		<input type="checkbox"/> Pasture/Grazing
			<input type="checkbox"/> Silviculture
			<input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>2</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.2</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>348</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ¹⁰ %	Run ⁶⁰ %	Pool ³⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			50
Sand (0.06 – 2 mm)			10
Gravel (2-64 mm)			20
Cobble (64 – 256 mm)			10
Boulders (>256 mm)			5
Bedrock			5

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">13</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">15</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">14</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">11</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">16</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 7 ----- RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 7 ----- RB 7	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 6 ----- RB 6	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

130

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s012		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM: PROJECT:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start: 13:32
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Industrial
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input checked="" type="checkbox"/> Row Crops
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Forest
	<input type="checkbox"/> Cloudy		<input type="checkbox"/> Pasture/Grazing
			<input type="checkbox"/> Silviculture
			<input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>6</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.5</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>56</u> m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁶⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			15
Sand (0.06 – 2 mm)			5
Gravel (2-64 mm)			20
Cobble (64 – 256 mm)			20
Boulders (>256 mm)			35
Bedrock			5

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">11</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">12</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">12</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">15</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">12</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 9 ----- RB 9	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 7 ----- RB 7	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

132

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1013 (Hewlett Creek)		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width $\frac{8}{}$ ft		<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth $\frac{0.5}{}$ ft		<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length $\frac{833}{}$ m		<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
____ Riffle ____ Run ____ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata ____ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble ____ Snags ____ Veg. Banks ____ Sand ____ Macrophytes ____ Other ____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ¹⁰ %	Run ⁸⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			15
Sand (0.06 – 2 mm)			5
Gravel (2-64 mm)			20
Cobble (64 – 256 mm)			20
Boulders (>256 mm)			35
Bedrock			5

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">6 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold;">6 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">5 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">11 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">5 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold;">10 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">8 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank <div style="text-align: right; font-weight: bold;">10 Score</div>	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability <div style="text-align: right; font-weight: bold;">4 LB ----- 4 RB</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection <div style="text-align: right; font-weight: bold;">7 LB ----- 7 RB</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width <div style="text-align: right; font-weight: bold;">6 LB ----- 6 RB</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

85

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1014		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.138554		
LONG	-87.961015		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>3</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.3</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>209</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁶⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			25
Sand (0.06 – 2 mm)			15
Gravel (2-64 mm)			25
Cobble (64 – 256 mm)			20
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">14</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">14</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">15</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">10</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 6 ----- RB 6	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 9 ----- RB 6	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

127

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1015			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Hess			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.138547				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.960998				
			STREAM TYPE: <input type="checkbox"/> Perennial <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent		
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>212</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other: _____ Lead Collector: _____					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁶⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				60	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				20	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				10	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">10</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">9</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 2 ----- RB 2	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 5	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

88

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1016		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.139818		
LONG	-87.962831		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input checked="" type="checkbox"/> Forest
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Cloudy		<input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>2</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.4</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>120</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ¹⁰ %	Run ⁸⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			70
Sand (0.06 – 2 mm)			10
Gravel (2-64 mm)			20
Cobble (64 – 256 mm)			0
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">5 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold;">6 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">5 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">8 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">6 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold;">10 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">8 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank <div style="text-align: center;"> <div style="display: flex; justify-content: space-around; width: 100%;"> 109876543210 </div> </div>																					
8. Bank Stability <div style="display: flex; justify-content: space-between;"> <div style="text-align: right; font-weight: bold;">5 LB</div> <div style="text-align: right; font-weight: bold;">5 RB</div> </div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection <div style="display: flex; justify-content: space-between;"> <div style="text-align: right; font-weight: bold;">6 LB</div> <div style="text-align: right; font-weight: bold;">6 RB</div> </div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width <div style="display: flex; justify-content: space-between;"> <div style="text-align: right; font-weight: bold;">6 LB</div> <div style="text-align: right; font-weight: bold;">6 RB</div> </div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

76

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1017 (Hewlett Creek)		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
		Downstream	Upstream
LAT			
LONG			
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>6</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.5</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>53</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ¹⁰ %	Run ⁸⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			15
Sand (0.06 – 2 mm)			5
Gravel (2-64 mm)			20
Cobble (64 – 256 mm)			20
Boulders (>256 mm)			35
Bedrock			5

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold; font-size: 1.2em;">11</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold; font-size: 1.2em;">8</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

85

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1018		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Hess		DATE: 5/25/2021	TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.964209		
LONG	-87.139162		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Industrial
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input checked="" type="checkbox"/> Row Crops
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Forest
	<input type="checkbox"/> Cloudy		<input checked="" type="checkbox"/> Pasture/Grazing
			<input type="checkbox"/> Silviculture
			<input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>1</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.2</u> ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	<u>45</u> m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁷⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			80
Sand (0.06 – 2 mm)			20
Gravel (2-64 mm)			0
Cobble (64 – 256 mm)			0
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 7	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 7	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 7	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 2 ----- RB 2	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

65

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1101			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME (24hr) Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.133501				CANOPY COVER:: <input checked="" type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.988105				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>1</u> ft Maximum Depth <u>0.4</u> ft Reach Length <u>410</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				60	
Sand (0.06 – 2 mm)				15	
Gravel (2-64 mm)				15	
Cobble (64 – 256 mm)				20	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

77

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1102			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME (24hr) Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.132858				CANOPY COVER:: <input checked="" type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.992157				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>0.4</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>351</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other: _____ Lead Collector: _____					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				60	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				15	
Cobble (64 – 256 mm)				15	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">2</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

90

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1103			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.132562				
LONG	87.988276				
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>0.8</u> ft Maximum Depth <u>0.4</u> ft Reach Length <u>101</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ¹⁰ %	Run ⁸⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				90	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 3	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 6	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 5	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 7 ----- RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 3 ----- RB 3	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

70

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1104			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		PROJECT:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			TIME (24hr)		Start:
					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.130842				
LONG	-87.977754				
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input type="checkbox"/> <input type="checkbox"/> Steady rain <input type="checkbox"/> <input type="checkbox"/> Intermittent showers <input type="checkbox"/> <input type="checkbox"/> Clear/sunny <input type="checkbox"/> <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>1.3</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>24</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				40	
Sand (0.06 – 2 mm)				30	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">4</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">4</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">3</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

75

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1105			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.134289				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input checked="" type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.977538				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width $\frac{10}{}$ ft Maximum Depth $\frac{0.5}{}$ ft Reach Length $\frac{935}{}$ m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁴⁰ %	Run ⁴⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				50	
Sand (0.06 – 2 mm)				5	
Gravel (2-64 mm)				30	
Cobble (64 – 256 mm)				60	
Boulders (>256 mm)				5	
Bedrock					

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">13</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">11</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">13</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">13</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">12</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 5	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

120

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1106			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.131785				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	87.977845				
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops		
<input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers					
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>2</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>32</u> m		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool				RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ³⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				75	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				15	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 10	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 11	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 8	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 10	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 10	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 10	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 7	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 7 RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 8 RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

114

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1107			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.131785				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	87.977845				
			STREAM TYPE: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent		
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>148</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ³⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				70	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 6	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 11	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 7 ----- RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 4 ----- RB 4	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

86

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1108		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Crystal Renskers		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.137473		
LONG	-87.980701		
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Industrial
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input checked="" type="checkbox"/> Row Crops
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Forest
	<input type="checkbox"/> Cloudy		<input checked="" type="checkbox"/> Pasture/Grazing
			<input type="checkbox"/> Silviculture
			<input type="checkbox"/> Urban Runoff/Storm Sewers
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>2</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.3</u> ft	<input type="checkbox"/> Bridge Abutments	<input checked="" type="checkbox"/> Pooled
Reach Length	<u>120</u> m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁴⁰ %	Run ⁴⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			80
Sand (0.06 – 2 mm)			10
Gravel (2-64 mm)			5
Cobble (64 – 256 mm)			5
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">6 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold;">10 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">6 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">6 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">5 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold;">10 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">10 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank <div style="text-align: right; font-weight: bold;">10 Score</div>	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability <div style="text-align: right; font-weight: bold;">5 LB ----- 5 RB</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection <div style="text-align: right; font-weight: bold;">8 LB ----- 8 RB</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width <div style="text-align: right; font-weight: bold;">7 LB ----- 7 RB</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

93

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1109			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input type="checkbox"/> <input type="checkbox"/> Steady rain <input type="checkbox"/> <input type="checkbox"/> Intermittent showers <input type="checkbox"/> <input type="checkbox"/> Clear/sunny <input type="checkbox"/> <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Forest <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Silviculture <input type="checkbox"/> Residential <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>2</u> ft Maximum Depth <u>2</u> ft Reach Length <u>16</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
			RIPARIAN VEGETATION		
			Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		
			CHANNEL ALTERATIONS		
			<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)		
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ _____ %	Run ⁶⁰ _____ %	Pool ¹⁰ _____ %	Reach Total	
Silt/Clay (<0.06 mm)				100	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">6 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold;">5 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">6 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">6 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">5 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold;">4 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">10 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
8. Bank Stability LB <div style="text-align: right; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold;">6</div> ----- RB <div style="text-align: right; font-weight: bold;">6</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-weight: bold;">5</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

74

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1110			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		PROJECT:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			TIME (24hr)		Start:
					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.136281				
LONG	-87.972373				
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width $\frac{12}{1}$ ft Maximum Depth $\frac{1}{1152}$ ft Reach Length _____ m Riffle/Run/Pool Sequence (No. Sampled in Reach) _____ Riffle _____ Run _____ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ____ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM					
Instrument Used: _____			Date Calibrated: _____		
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other: _____					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁴⁰ %	Run ²⁰ %	Pool ⁴⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				10	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				35	
Cobble (64 – 256 mm)				35	
Boulders (>256 mm)				5	
Bedrock				10	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">12</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">11</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">11</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">10</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">15</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">13</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 5	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

120

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1111			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.135519				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.983252				
			STREAM TYPE: <input type="checkbox"/> Perennial <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent		
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>553</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				50	
Sand (0.06 – 2 mm)				50	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">4</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">4</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

82

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1112		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Crystal Renskers		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.135519		
LONG	-87.983252		
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	2 ft	<input type="checkbox"/> Dams	<input checked="" type="checkbox"/> Dry
Maximum Depth	0.5 ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	187 m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs
			Number of strata ___ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			50
Sand (0.06 – 2 mm)			30
Gravel (2-64 mm)			10
Cobble (64 – 256 mm)			10
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">5 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold;">10 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">5 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">5 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">5 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold;">8 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">8 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
8. Bank Stability LB <div style="text-align: right; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold;">9</div> ----- RB <div style="text-align: right; font-weight: bold;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold;">4</div> ----- RB <div style="text-align: right; font-weight: bold;">4</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

82

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1113		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Crystal Renskers		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.132647		
LONG	-87.982599		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	2.5 ft	<input type="checkbox"/> Dams	<input checked="" type="checkbox"/> Dry
Maximum Depth	0.4 ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	163 m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs
			Number of strata ___ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector:
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector:
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector:
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector:
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector:
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector:
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			10
Sand (0.06 – 2 mm)			15
Gravel (2-64 mm)			35
Cobble (64 – 256 mm)			35
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">6 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold;">6 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">5 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">9 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">8 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold;">10 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">10 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank <div style="text-align: right; font-weight: bold;">10 Score</div>	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability <div style="text-align: right; font-weight: bold;">5 LB ----- 5 RB</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection <div style="text-align: right; font-weight: bold;">9 LB ----- 9 RB</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width <div style="text-align: right; font-weight: bold;">9 LB ----- 9 RB</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

100

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1114			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.132599				
LONG	-87.982749				
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers <input type="checkbox"/> Residential		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width $\frac{3}{\quad}$ ft Maximum Depth $\frac{0.4}{\quad}$ ft Reach Length $\frac{24}{\quad}$ m Riffle/Run/Pool Sequence (No. Sampled in Reach) _____ Riffle _____ Run _____ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ____ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ _____ %	Run ⁵⁰ _____ %	Pool ²⁰ _____ %	Reach Total	
Silt/Clay (<0.06 mm)				10	
Sand (0.06 – 2 mm)				30	
Gravel (2-64 mm)				35	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				5	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">10</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">9</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">13</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

114

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1115			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.132975				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	87.981890				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>1</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>60</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ³⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				90	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 3	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 8	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 4	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 11	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 7 ----- RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

95

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1116			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.132419				
LONG	87.981618				
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>1</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>28</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
			RIPARIAN VEGETATION		
			Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		
			CHANNEL ALTERATIONS		
			<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)		
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ³⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				75	
Sand (0.06 – 2 mm)				25	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 6	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 7	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 7	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 6	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 6	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 7 ----- RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

90

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1117		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Crystal Renskers		DATE: 5/25/2021	TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.138021		
LONG	-87.974895		
WEATHER		LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input checked="" type="checkbox"/> Forest
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input checked="" type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	<u>3</u> ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	<u>0.4</u> ft	<input type="checkbox"/> Bridge Abutments	<input checked="" type="checkbox"/> Pooled
Reach Length	<u>38</u> m	<input type="checkbox"/> Island	<input type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
<u> </u> Riffle <u> </u> Run <u> </u> Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata <u> </u> Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____			
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____			
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			0
Sand (0.06 – 2 mm)			20
Gravel (2-64 mm)			40
Cobble (64 – 256 mm)			40
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">11</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">10</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">9</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 2 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

105

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1118			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.137664				
LONG	-87.974793				
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops		
<input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers					
INSTREAM FEATURES			HYDRAULIC STRUCTURES		STREAM FLOW
Stream Width <u>1.5</u> ft Maximum Depth <u>0.3</u> ft Reach Length <u>31</u> m			<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal
Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool					RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa
					CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				10	
Sand (0.06 – 2 mm)				30	
Gravel (2-64 mm)				60	
Cobble (64 – 256 mm)				20	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold; font-size: 1.2em;">11</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold; font-size: 1.2em;">13</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold; font-size: 1.2em;">10</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div> ----- RB <div style="text-align: right; font-weight: bold; font-size: 1.2em;">6</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

107

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1119			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.137226				
LONG	-87.974010				
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>5</u> ft Maximum Depth <u>0.4</u> ft Reach Length <u>27</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				15	
Sand (0.06 – 2 mm)				30	
Gravel (2-64 mm)				30	
Cobble (64 – 256 mm)				15	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">11</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">10</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">10</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB 9 ----- RB 9	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 6 ----- RB 6	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

107

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1120			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.132690				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.973398				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>600</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				40	
Sand (0.06 – 2 mm)				25	
Gravel (2-64 mm)				20	
Cobble (64 – 256 mm)				15	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

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High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1121			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME (24hr) Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.131652				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.972956				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>1.5</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>20</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other: _____ Lead Collector: _____					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				65	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				25	
Cobble (64 – 256 mm)				15	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

95

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1122			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.131463				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.973578				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>3</u> ft Maximum Depth <u>0.2</u> ft Reach Length <u>137</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				85	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				5	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
 Site not found/Secluded Unsafe
 Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

100

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1123			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.141094				CANOPY COVER:: <input checked="" type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	87.966179				
			STREAM TYPE: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent		
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width $\frac{3}{\quad}$ ft Maximum Depth $\frac{0.2}{\quad}$ ft Reach Length $\frac{134}{\quad}$ m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ⁵⁰ %	Run ³⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				100	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 3	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 2	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 6	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 2	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 6	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 5	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 7 ----- RB 7	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 5 ----- RB 5	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

69

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1124			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME (24hr) Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.131463				
LONG	-87.973578				
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops		
			<input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>3</u> ft Maximum Depth <u>1.5</u> ft Reach Length <u>49</u> m		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool				RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁵⁰ %	Pool ²⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				100	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">6</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-weight: bold;">10</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">6</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">5</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">5</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-weight: bold;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-weight: bold;">9</div> ----- RB <div style="text-align: right; font-weight: bold;">9</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-weight: bold;">5</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

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High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: S1125			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Crystal Renskers			DATE: 5/25/2021		PROJECT:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			TIME (24hr)		Start:
					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.131463				
LONG	-87.973578				
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>1.3</u> ft Maximum Depth <u>.4</u> ft Reach Length <u>24</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
			RIPARIAN VEGETATION		
			Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		
			CHANNEL ALTERATIONS		
			<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)		
P-CHEM					
Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ _____ %	Run ⁵⁰ _____ %	Pool ²⁰ _____ %	Reach Total	
Silt/Clay (<0.06 mm)				90	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">4</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0										
8. Bank Stability LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
9. Vegetative Protection LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> ----- RB <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					

Total Score

NOTES/COMMENTS:

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Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1201			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.148864				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.975111				
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>4</u> ft Maximum Depth <u>1</u> ft Reach Length <u>82</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁷⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				100	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				0	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:	
<input type="checkbox"/> Land owner denial	<input type="checkbox"/> Dry <input type="checkbox"/> Too deep/Impounded
<input type="checkbox"/> Site not found/Secluded	<input type="checkbox"/> Unsafe
<input type="checkbox"/> Other (indicate under comments)	

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 5	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 8	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 2 ----- RB 2	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

68

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1202		LOCATION: Fredonia, KY	
STATION #:		COUNTY: Caldwell, KY	PROGRAM:
INVESTIGATORS: Ben Harvey		DATE: 5/25/2021	TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			Finish:
Station		Reach	
	Downstream	Upstream	
LAT	37.145848		
LONG	-87.973862		
WEATHER		LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):	
Now	Past 24 hours	<input type="checkbox"/> Surface Mining	<input type="checkbox"/> Construction
Has there been a scouring rain in the last 14 days?	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Deep Mining	<input type="checkbox"/> Commercial
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Steady rain	<input type="checkbox"/> Oil Wells	<input checked="" type="checkbox"/> Pasture/Grazing
	<input type="checkbox"/> Intermittent showers	<input type="checkbox"/> Land Disposal	<input type="checkbox"/> Silviculture
	<input type="checkbox"/> Clear/sunny	<input type="checkbox"/> Residential	<input type="checkbox"/> Urban Runoff/Storm Sewers
	<input type="checkbox"/> Cloudy		
INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW
Stream Width	2 ft	<input type="checkbox"/> Dams	<input type="checkbox"/> Dry
Maximum Depth	0.5 ft	<input type="checkbox"/> Bridge Abutments	<input type="checkbox"/> Pooled
Reach Length	346 m	<input type="checkbox"/> Island	<input checked="" type="checkbox"/> Low
Riffle/Run/Pool Sequence (No. Sampled in Reach)		<input type="checkbox"/> Waterfalls	<input type="checkbox"/> High
___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Other:	<input type="checkbox"/> Normal
			RIPARIAN VEGETATION
			Dominate Type:
			<input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous
			<input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs
			Number of strata ___ Dom.
			Tree/Shrub Taxa
			CHANNEL ALTERATIONS
			<input type="checkbox"/> Dredging
			<input type="checkbox"/> Channelization
			(<input type="checkbox"/> Full <input type="checkbox"/> Partial)
P-CHEM			
Instrument Used: _____		Date Calibrated: _____	
Temp(°C) _____	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____
		Cond. _____	Turb. _____
Sample Collection Verification			
Algae	Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other	<input type="checkbox"/> Visual Assessment	Lead Collector: _____
Fish	<input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other	Time: BPEF _____ Seine _____	Lead Collector: _____
Habitat	<input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other:		Lead Collector: _____
Invertebrates	<input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other:		Lead Collector: _____
	<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)		
Tissue:	No. of Samples collected _____ Sp:		Lead Collector: _____
Water Chem	<input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg		Lead Collector: _____
	<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:		
Duplicate Samples Taken:			
Substrate Characterization			
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁷⁰ %	Pool ¹⁰ %
			Reach Total
Silt/Clay (<0.06 mm)			100
Sand (0.06 – 2 mm)			0
Gravel (2-64 mm)			0
Cobble (64 – 256 mm)			0
Boulders (>256 mm)			0
Bedrock			0

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability Score 0	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 0	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 11	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 8	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 2 ----- RB 2	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

58

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1203			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		PROJECT:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			TIME (24hr)		Start:
					Finish:
Station			Reach		
			Downstream		Upstream
LAT			CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		STREAM TYPE: <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent
LONG					
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>16</u> ft Maximum Depth <u>1</u> ft Reach Length <u>651</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other: _____ Lead Collector: _____					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				20	
Sand (0.06 – 2 mm)				5	
Gravel (2-64 mm)				25	
Cobble (64 – 256 mm)				30	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 1.2em;">16</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 1.2em;">15</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 1.2em;">14</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 1.2em;">12</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 1.2em;">15</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 1.2em;">13</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 1.2em;">11</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 6 ----- RB 6	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 8 ----- RB 8	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 5 ----- RB 5	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

134

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1204			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					TIME Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER			LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Land Disposal <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width $\frac{8}{\quad}$ ft Maximum Depth $\frac{0.5}{\quad}$ ft Reach Length $\frac{105}{\quad}$ m Riffle/Run/Pool Sequence (No. Sampled in Reach) _____ Riffle _____ Run _____ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ____ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM					
Instrument Used: _____			Date Calibrated: _____		
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ _____ %	Run ⁶⁰ _____ %	Pool ¹⁰ _____ %	Reach Total	
Silt/Clay (<0.06 mm)				20	
Sand (0.06 – 2 mm)				20	
Gravel (2-64 mm)				50	
Cobble (64 – 256 mm)				10	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-size: 24pt; font-weight: bold;">10</div> Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-size: 24pt; font-weight: bold;">8</div> Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-size: 24pt; font-weight: bold;">5</div> Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-size: 24pt; font-weight: bold;">6</div> Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-size: 24pt; font-weight: bold;">11</div> Score	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-size: 24pt; font-weight: bold;">7</div> Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability LB 4 ----- RB 4	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection LB 7 ----- RB 7	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width LB 6 ----- RB 6	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

NOTES/COMMENTS:

92

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1205			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		TIME Start: 11:37
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.148864				CANOPY COVER:: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.975111				
			STREAM TYPE: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent		
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.8</u> ft Reach Length <u>1149</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁷⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				95	
Sand (0.06 – 2 mm)				0	
Gravel (2-64 mm)				5	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 9	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 8	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 10	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 6	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
Left/Right Bank	10	9				8	7	6			5	4	3			2	1	0			
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 5 ----- RB 5	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 9 ----- RB 9	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

86

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1206			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		TIME Start:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					Finish:
Station			Reach		
			Downstream		Upstream
LAT	37.144180				CANOPY COVER:: <input checked="" type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
LONG	-87.971343				
			STREAM TYPE: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent		
WEATHER Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use): <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal <input type="checkbox"/> Residential		
Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy <input type="checkbox"/>			<input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Row Crops <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers		
INSTREAM FEATURES Stream Width <u>2</u> ft Maximum Depth <u>0.5</u> ft Reach Length <u>815</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		HYDRAULIC STRUCTURES <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		STREAM FLOW <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
		RIPARIAN VEGETATION Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Grasses <input type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa		CHANNEL ALTERATIONS <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____ <input type="checkbox"/> 20 Jab (#Jabs: Cobble ___ Snags ___ Veg. Banks ___ Sand ___ Macrophytes ___ Other ___)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____ <input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ²⁰ %	Run ⁷⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				80	
Sand (0.06 – 2 mm)				10	
Gravel (2-64 mm)				10	
Cobble (64 – 256 mm)				0	
Boulders (>256 mm)				0	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP Low Gradient Habitat

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1. Epifaunal Substrate/ Available Cover Score 5	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new and transient).					30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
2. Pool Substrate Characterization Score 5	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
3. Pool Variability 5	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
4. Sediment Deposition Score 8	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material; increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
5. Channel Flow Status Score 5	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
6. Channel Alteration Score 5	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (>20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
7. Channel Sinuosity Score 6	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.					
8. Bank Stability LB 5 ----- RB 5	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars					
9. Vegetative Protection LB 4 ----- RB 4	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
10. Riparian Vegetative Zone Width LB 3 ----- RB 3	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.					

Total Score

63

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1207			LOCATION: Fredonia, KY		
STATION #:			COUNTY: Caldwell, KY		PROGRAM:
INVESTIGATORS: Ben Harvey			DATE: 5/25/2021		PROJECT:
Verify Site LAT/LONG vs GPS <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			TIME (24hr)		Start:
					Finish:
Station			Reach		
			Downstream		Upstream
LAT					
LONG					
WEATHER			LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):		
Now Past 24 hours Has there been a scouring rain in the last 14 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Cloudy			<input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers <input type="checkbox"/> Residential		
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width <u>5</u> ft Maximum Depth <u>1.2</u> ft Reach Length <u>136</u> m Riffle/Run/Pool Sequence (No. Sampled in Reach) ___ Riffle ___ Run ___ Pool		<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other:		<input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> High <input type="checkbox"/> Normal	
				RIPARIAN VEGETATION	
				Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Herbaceous <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Shrubs Number of strata ___ Dom. Tree/Shrub Taxa	
				CHANNEL ALTERATIONS	
				<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
P-CHEM Instrument Used: _____ Date Calibrated: _____					
Temp(°C) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____					
Sample Collection Verification					
Algae Sample: <input type="checkbox"/> QualMHC <input type="checkbox"/> Other <input type="checkbox"/> Visual Assessment Lead Collector: _____					
Fish <input type="checkbox"/> BPEF <input type="checkbox"/> Seine <input type="checkbox"/> Other Time: BPEF _____ Seine _____ Lead Collector: _____					
Habitat <input type="checkbox"/> RBP <input type="checkbox"/> Substrate <input type="checkbox"/> Other: _____ Lead Collector: _____					
Invertebrates <input type="checkbox"/> 1m ² <input type="checkbox"/> Qual <input type="checkbox"/> Other: _____ Lead Collector: _____					
<input type="checkbox"/> 20 Jab (#Jabs: Cobble _____ Snags _____ Veg. Banks _____ Sand _____ Macrophytes _____ Other _____)					
Tissue: No. of Samples collected _____ Sp: _____ Lead Collector: _____					
Water Chem <input type="checkbox"/> Acid/Alk <input type="checkbox"/> Bulk <input type="checkbox"/> Nutrients <input type="checkbox"/> Metals <input type="checkbox"/> Low Hg Lead Collector: _____					
<input type="checkbox"/> Herbicides <input type="checkbox"/> Pesticides <input type="checkbox"/> Ortho P <input type="checkbox"/> Other:					
Duplicate Samples Taken:					
Substrate Characterization					
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle ³⁰ %	Run ⁶⁰ %	Pool ¹⁰ %	Reach Total	
Silt/Clay (<0.06 mm)				55	
Sand (0.06 – 2 mm)				40	
Gravel (2-64 mm)				30	
Cobble (64 – 256 mm)				13	
Boulders (>256 mm)				2	
Bedrock				0	

NOTES/COMMENTS:

SITE NOT SAMPLED:

- Land owner denial Dry Too deep/Impounded
- Site not found/Secluded Unsafe
- Other (indicate under comments)

RBP High Gradient Habitat

Habitat Parameter	Condition Category																					
	Optimal					Suboptimal					Marginal					Poor						
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1. Epifaunal Substrate/ Available Cover <div style="text-align: right; font-weight: bold;">12 Score</div>	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.						
2. Embeddedness <div style="text-align: right; font-weight: bold;">12 Score</div>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.						
3. Velocity/ Depth Regime <div style="text-align: right; font-weight: bold;">14 Score</div>	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).						
4. Sediment Deposition <div style="text-align: right; font-weight: bold;">11 Score</div>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.						
5. Channel Flow Status <div style="text-align: right; font-weight: bold;">10 Score</div>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.						
6. Channel Alteration <div style="text-align: right; font-weight: bold;">12 Score</div>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.						
7. Frequency of Riffles (or bends) <div style="text-align: right; font-weight: bold;">8 Score</div>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.						
Left/Right Bank <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">LB 4</div> <div style="text-align: center;">RB 4</div> </div>	10	9	8	7	6	5	4	3	2	1	0	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">LB 4</div> <div style="text-align: center;">RB 4</div> </div>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.						
9. Vegetative Protection <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">LB 7</div> <div style="text-align: center;">RB 7</div> </div>	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.						
10. Riparian Vegetative Zone Width <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">LB 9</div> <div style="text-align: center;">RB 9</div> </div>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.						

Total Score

119

NOTES/COMMENTS:

About Cardno

Cardno is an ASX-200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage, and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

Cardno Zero Harm

Cardno
**ZERO
HARM**
EVERY JOB. EVERY DAY.

At Cardno, our primary concern is to develop and maintain safe and healthy conditions for anyone involved at our project worksites. We require full compliance with our Health and Safety Policy Manual and established work procedures and expect the same protocol from our subcontractors. We are committed to achieving our Zero Harm goal by continually improving our safety systems, education, and vigilance at the workplace and in the field.

Safety is a Cardno core value and through strong leadership and active employee participation, we seek to implement and reinforce these leading actions on every job, every day.