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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	12"
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Packera glabella*	10	No	OBL
2. *Carex tribuloides*	10	No	FACW
3. *Lysimachia nummularia*	40	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	10	x 1 =	10
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		110 (B)
Prevalence Index = B/A =			1.83

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0001

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0002

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Taraxacum officinale*	5	No	FACU
2. *Poa pratensis*	30	Yes	FACU
3. *Schedonorus arundinaceus*	60	Yes	FACU
4. *Stellaria media*	10	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	105 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95	x 4 =	380
UPL species	10	x 5 =	50
Column Totals:	105 (A)		430 (B)
Prevalence Index = B/A =			4.10

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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.): Footslope | 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	30	Yes	FACW
2. *Morus alba*	10	No	UPL
3. *Gleditsia triacanthos*	40	Yes	FAC
4. *Prunus serotina*	10	No	FACU
5. *Juglans nigra*	10	No	FACU
6.			
7.			
	100	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Viola sororia*	25	Yes	FAC
2. *Elymus virginicus*	40	Yes	FACW
3. *Ambrosia trifida*	10	No	FAC
4. *Conium maculatum*	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: 30 ft.)			
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	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	75	x 3 =	225
FACU species	20	x 4 =	80
UPL species	10	x 5 =	50
Column Totals:	185 (A)		515 (B)
Prevalence Index = B/A =			2.78

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0003

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

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

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No** ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	20	Yes	FACW
2. *Ulmus americana*	20	Yes	FACW
3. *Platanus occidentalis*	30	Yes	FACW
4.			
5.			
6.			
7.			
	70	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Symphyotrichum lanceolatum*	10	Yes	FACW
2. *Packera glabella*	5	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	15	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	5	x 1 =	5
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		165 (B)
Prevalence Index = B/A =			1.94

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- _____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- _____ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0005

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

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Elymus virginicus*	70	Yes	FACW
2. *Conium maculatum*	10	No	FACW
3. *Stellaria media*	20	No	UPL
4. *Galium aparine*	5	No	FACU
5. *Lamium purpureum*	20	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	0	x 1 =	0
FACW species	130	x 2 =	260
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	50	x 5 =	250
Column Totals:	205 (A)		590 (B)
Prevalence Index = B/A =			2.88

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0005

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	12"
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Platanus occidentalis*	40	Yes	FACW
2. *Celtis laevigata*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	25	Yes	OBL
2. *Celtis laevigata*	10	Yes	FACW
3. *Acer negundo*	10	Yes	FAC
4.			
5.			
6.			
7.			
	45	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Symphyotrichum lanceolatum*	10	Yes	FACW
2. *Viola sororia*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	20	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
1.			
2.			
3.			
4.			
		= Total Cover	

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)

Prevalence Index worksheet:

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

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0006

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0007

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	30	Yes	FACU
2. *Celtis laevigata*	30	Yes	FACW
3. *Ulmus americana*	20	Yes	FACW
4.			
5.			
6.			
7.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Symphoricarpos orbiculatus*	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Delphinium tricorne*	10	Yes	UPL
2. *Viola sororia*	40	Yes	FAC
3. *Viola pubescens*	10	Yes	FACU
4. *Claytonia virginica*	5	No	FAC
5. *Chaerophyllum procumbens*	10	Yes	FACW
6. *Carex grisea*	10	Yes	FACU
7. *Elymus virginicus*	10	Yes	FACW
8. *Toxicodendron radicans*	10	Yes	FAC
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	105	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	55	x 3 =	165
FACU species	90	x 4 =	360
UPL species	10	x 5 =	50
Column Totals:	225 (A)		715 (B)
Prevalence Index = B/A =			3.18

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus americana*	35	Yes	FACW
2. *Acer negundo*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	45	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex tribuloides*	10	Yes	FACW
2. *Symphyotrichum lanceolatum*	10	Yes	FACW
3. *Lysimachia nummularia*	5	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	25	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		150 (B)
Prevalence Index = B/A =			2.14

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Xanthium strumarium*	35	Yes	FAC
2. *Symphyotrichum lanceolatum*	35	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	70	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		175 (B)
Prevalence Index = B/A =			2.50

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0009

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0010

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

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Carex grisea*	70	Yes	FACU
2. *Viola sororia*	50	Yes	FAC
3. *Symphyotrichum lanceolatum*	20	No	FACW
4. *Elymus virginicus*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	145	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 5 (B)

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

Prevalence Index worksheet:

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

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0010

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0011

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

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

Herb Stratum (Plot size: 5 ft.)	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	

Woody Vine Stratum (Plot size: 30 ft.)	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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = 0.00

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	6"	
Water Table Present?	Yes ____	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface	**Wetland Hydrology Present? Yes X No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Alisma subcordatum*	20	Yes	OBL
2. *Lysimachia nummularia*	10	Yes	FACW
3. *Carex tribuloides*	10	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	20	x 1 =	20
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	40 (A)		60 (B)
Prevalence Index = B/A =			1.50

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0013

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	25	Yes	FACU
2. *Celtis laevigata*	40	Yes	FACW
3. *Ulmus americana*	10	No	FACW
4. *Aesculus glabra*	20	Yes	FACU
5.			
6.			
7.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Aesculus glabra*	10	Yes	FACU
2. *Symphoricarpos orbiculatus*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Viola sororia*	20	Yes	FAC
2. *Cryptotaenia canadensis*	10	Yes	FAC
3. *Polypodium virginianum*	20	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	50	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	30	x 3 =	90
FACU species	75	x 4 =	300
UPL species	20	x 5 =	100
Column Totals:	175 (A)		590 (B)
Prevalence Index = B/A =			3.37

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus effusus*	30	Yes	FACW
2. *Carex tribuloides*	5	No	FACW
3. *Schedonorus arundinaceus*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	40 (A)		90 (B)
Prevalence Index = B/A =			2.25

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0014

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa palustris*	50	Yes	OBL
2. *Acer rubrum*	5	No	FAC
3. *Ulmus americana*	15	Yes	FACW
4.			
5.			
6.			
7.			
	70	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus effusus*	20	Yes	FACW
2. *Carex tribuloides*	20	Yes	FACW
3. *Schedonorus arundinaceus*	20	Yes	FACU
4. *Solidago gigantea*	10	No	FACW
5. *Clematis virginiana*	5	No	FAC
6. *Ludwigia alternifolia*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	50	x 1 =	50
FACW species	70	x 2 =	140
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	150 (A)		300 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0015

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0016

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Stellaria media*	30	Yes	UPL
2. *Cardamine hirsuta*	20	No	FACU
3. *Poa annua*	30	Yes	FACU
4. *Lamium amplexicaule*	25	Yes	UPL
5. *Lamium purpureum*	10	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	65	x 5 =	325
Column Totals:	115 (A)		525 (B)
Prevalence Index = B/A =			4.57

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 1"
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP0017

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Viola sororia*	1	No	FAC
2. *Xanthium strumarium*	5	Yes	FAC
3. *Glyceria striata*	1	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	7	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	1	x 1 =	1
FACW species	0	x 2 =	0
FAC species	6	x 3 =	18
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	7 (A)		19 (B)
Prevalence Index = B/A =			2.71

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):
Water Table Present?	Yes ____	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	25	Yes	FACW
2. *Acer saccharum*	25	Yes	FACU
3. *Fraxinus americana*	20	Yes	FACU
4. *Juglans nigra*	10	No	FACU
5. *Acer negundo*	10	No	FAC
6.			
7.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Aesculus glabra*	40	Yes	FACU
2. *Lindera benzoin*	5	No	FAC
3.			
4.			
5.			
6.			
7.			
	45	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Phlox divaricata*	5	No	FACU
2. *Enemion biternatum*	10	No	FACU
3. *Hydrophyllum macrophyllum*	5	No	UPL
4. *Laportea canadensis*	50	Yes	FAC
5. *Poa pratensis*	10	No	FACU
6. *Claytonia virginica*	5	No	FAC
7. *Ornithogalum umbellatum*	10	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	70	x 3 =	210
FACU species	130	x 4 =	520
UPL species	5	x 5 =	25
Column Totals:	230 (A)		805 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0018

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	20	Yes	FACW
2. *Platanus occidentalis*	20	Yes	FACW
3. *Ulmus americana*	20	Yes	FACW
4.			
5.			
6.			
7.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Sambucus nigra*	40	Yes	FAC
2. *Viola sororia*	10	No	FAC
3. *Cryptotaenia canadensis*	20	Yes	FAC
4. *Symphyotrichum lanceolatum*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	75	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	65	x 2 =	130
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	135 (A)		340 (B)
Prevalence Index = B/A =			2.52

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0019

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	20	Yes	FACW
2. *Platanus occidentalis*	5	No	FACW
3. *Ulmus americana*	5	No	FACW
4.			
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
		= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	50 (A)		100 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0020

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 12"

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes ____ No X Depth (inches): ____

(includes capillary fringe)

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	30	Yes	FACW
2. *Celtis laevigata*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Carex tribuloides*	60	Yes	FACW
2. *Persicaria punctata*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	65	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	5	x 1 =	5
FACW species	110	x 2 =	220
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		225 (B)
Prevalence Index = B/A =			1.96

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0021

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	12"
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	30	Yes	FACW
2. *Celtis laevigata*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Carex tribuloides*	10	Yes	FACW
2. *Symphyotrichum lanceolatum*	30	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	40	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		180 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0022

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0023

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	25	Yes	FACU
2. *Acer saccharum*	80	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	105	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	80	Yes	FACW
2. *Fraxinus americana*	10	No	FACU
3. *Ulmus americana*	5	No	FACW
4.			
5.			
6.			
7.			
	95	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex jamesii*	25	Yes	UPL
2. *Symphoricarpos orbiculatus*	10	Yes	FACU
3. *Galium aparine*	5	No	FACU
4. *Osmorhiza claytonii*	5	No	FACU
5. *Viola pubescens*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 5 (B)

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

Prevalence Index worksheet:

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

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0023

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	6"
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
		= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	40 (A)		80 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0024

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	20	Yes	FACW
2. *Acer negundo*	10	No	FAC
3. *Symphoricarpos orbiculatus*	29	Yes	FACU
4.			
5.			
6.			
7.			
	59	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex grisea*	30	Yes	FACU
2. *Elymus virginicus*	10	Yes	FACW
3. *Glechoma hederacea*	5	No	FACU
4. *Symphyotrichum lanceolatum*	10	Yes	FACW
5. *Geum canadense*	5	No	FACU
6. *Viola pubescens*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 5 (B)

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

Prevalence Index worksheet:

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

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0025

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0101

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	50	Yes	FACU
2. *Triticum aestivum*	40	Yes	UPL
3. *Oenothera biennis*	3	No	FACU
4. *Rumex crispus*	3	No	FAC
5. *Ambrosia trifida*	10	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	106 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	13	x 3 =	39
FACU species	53	x 4 =	212
UPL species	40	x 5 =	200
Column Totals:	106 (A)		451 (B)
Prevalence Index = B/A =			4.25

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0102

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Rumex crispus*	35	Yes	FAC
2. *Chaerophyllum procumbens*	5	No	FACW
3. *Ambrosia trifida*	10	No	FAC
4. *Elymus virginicus*	75	Yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	125 (A)		295 (B)
Prevalence Index = B/A =			2.36

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 4/4	90	10YR 4/3	10	C	M	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	85	Yes	FACU
2. *Phalaris arundinacea*	15	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals:	100 (A)		370 (B)
Prevalence Index = B/A =			3.70

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 4/3	95	5YR 6/8	5	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Packera glabella*	3	Yes	OBL
2. *Rumex crispus*	5	Yes	FAC
3. *Euphorbia maculata*	3	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	11	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	3	x 1 =	3
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	11 (A)		30 (B)
Prevalence Index = B/A =			2.73

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					Clay loam	
2-20"	10YR 4/4	97	10YR 4/6	3	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Poa pratensis*	5	No	FACU
2. *Schedonorus arundinaceus*	45	Yes	FACU
3. *Ambrosia trifida*	20	Yes	FAC
4. *Packera glabella*	3	No	OBL
5. *Solidago canadensis*	3	No	FACU
6. *Cardamine hirsuta*	10	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	86	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	3	x 1 =	3
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	63	x 4 =	252
UPL species	0	x 5 =	0
Column Totals:	86 (A)		315 (B)
Prevalence Index = B/A =			3.66

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					Clay loam	
2-20"	10YR 4/4	97	10YR 4/6	3	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Acer negundo*	3	No	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	3 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Ambrosia trifida*	70	Yes	FAC
2. *Carex tribuloides*	10	No	FACW
3. *Elymus virginicus*	3	No	FACW
4. *Rumex crispus*	3	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	86 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	13	x 2 =	26
FAC species	76	x 3 =	228
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	89 (A)		254 (B)
Prevalence Index = B/A =			2.85

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0106

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0107

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Rumex crispus*	35	Yes	FAC
2. *Carex tribuloides*	10	No	FACW
3. *Elymus virginicus*	3	No	FACW
4. *Sorghum halepense*	60	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	108 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	13	x 2 =	26
FAC species	35	x 3 =	105
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	108 (A)		371 (B)
Prevalence Index = B/A =			3.44

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0107

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** Yes ____ No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0108

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	2	No	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	2 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Elymus virginicus*	65	Yes	FACW
2. *Rumex crispus*	15	No	FAC
3. *Solidago canadensis*	5	No	FACU
4. *Poa pratensis*	5	No	FACU
5. *Packera glabella*	3	No	OBL
6. *Erigeron philadelphicus*	3	No	FACU
7. *Cardamine hirsuta*	2	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	98 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	3	x 1 =	3
FACW species	67	x 2 =	134
FAC species	15	x 3 =	45
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	100 (A)		242 (B)
Prevalence Index = B/A =			2.42

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0108

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 4/3	80					Clay Loam	
0-20"	10YR 4/6	20					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** Yes ____ No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0109

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Rumex crispus*	40	Yes	FAC
2. *Setaria faberi*	10	No	UPL
3. *Carex frankii*	10	No	OBL
4. *Cardamine hirsuta*	5	No	FACU
5. *Packera glabella*	5	No	OBL
6. *Carex lurida*	3	No	OBL
7. *Galium aparine*	3	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	76	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	18	x 1 =	18
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	8	x 4 =	32
UPL species	10	x 5 =	50
Column Totals:	76 (A)		220 (B)
Prevalence Index = B/A =			2.89

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0109

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 3/4	100					Clay Loam	
4-20"	10YR 4/4	95	7.5YR 4/6	5	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0110

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Sambucus nigra*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Verbena urticifolia*	5	No	FAC
2. *Persicaria lapathifolia*	10	Yes	FACW
3. *Setaria faberi*	5	No	UPL
4. *Panicum virgatum*	40	Yes	FAC
5. *Rumex crispus*	5	No	FAC
6. *Brassica nigra*	10	Yes	UPL
7. *Glycine max*	5	No	UPL
8. *Elymus virginicus*	3	No	FACW
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	83 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	0	x 1 =	0
FACW species	13	x 2 =	26
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	88 (A)		291 (B)
Prevalence Index = B/A =			3.31

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0110

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 4/3	100					Clay loam	
4-20"	10YR 4/4	95	10yr 4/6	5	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	Yes X	No
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes X** **No**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Sambucus nigra*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Elymus virginicus*	50	Yes	FACW
2. *Rumex crispus*	30	Yes	FAC
3. *Ambrosia trifida*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	90 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		235 (B)
Prevalence Index = B/A =			2.47

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0111

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 4/4	100					Clay loam	
5-20"	10YR 4/2	95	10YR 5/6	5	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0112

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Rumex crispus*	35	Yes	FAC
2. *Ambrosia trifida*	5	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	40 (A)		120 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 4/4	100					Clay loam	
5-20"	10YR 4/2	95	10YR 5/6	5	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0113

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Gleditsia triacanthos*	5	Yes	FAC
2. *Celtis laevigata*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Lamium purpureum*	40	Yes	UPL
2. *Rumex crispus*	5	No	FAC
3. *Cirsium vulgare*	5	No	FACU
4. *Solidago canadensis*	10	No	FACU
5. *Cardamine hirsuta*	3	No	FACU
6. *Geranium carolinianum*	3	No	UPL
7. *Allium canadense*	1	No	FACU
8. *Lamium amplexicaule*	1	No	UPL
9. *Packera glabella*	3	No	OBL
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	71	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
1. *Lonicera japonica*	30	Yes	FAC
2.			
3.			
4.			
	30	= 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:	
OBL species	3	x 1 =	3
FACW species	10	x 2 =	20
FAC species	40	x 3 =	120
FACU species	19	x 4 =	76
UPL species	44	x 5 =	220
Column Totals:	116 (A)		439 (B)
Prevalence Index = B/A =			3.78

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0113

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 4/4	90	7.5YR 4/6	10	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0114

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus alba*	30	Yes	FACU
2. *Celtis laevigata*	30	Yes	FACW
3. *Juglans nigra*	25	Yes	FACU
4. *Ulmus rubra*	25	Yes	FAC
5. *Robinia pseudoacacia*	15	No	FACU
6. *Juniperus virginiana*	5	No	FACU
7.			
	130	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	25	Yes	FACW
2. *Ulmus rubra*	10	Yes	FAC
3. *Symphoricarpos orbiculatus*	5	No	FACU
4. *Rosa multiflora*	5	No	FACU
5. *Fraxinus americana*	5	No	FACU
6.			
7.			
	50	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Geum canadense*	20	Yes	FACU
2. *Symphoricarpos orbiculatus*	40	Yes	FACU
3. *Lamium purpureum*	10	No	UPL
4. *Carex blanda*	10	No	FAC
5. *Lonicera japonica*	10	No	FAC
6. *Galium aparine*	5	No	FACU
7. *Erigeron philadelphicus*	5	No	FACU
8. *Toxicodendron radicans*	5	No	FAC
9. *Cynoglossum virginianum*	3	No	UPL
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	108	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	60	x 3 =	180
FACU species	160	x 4 =	640
UPL species	13	x 5 =	65
Column Totals:	288 (A)		995 (B)
Prevalence Index = B/A =			3.45

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0114

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 4/4	100					Clay loam	
4-20"	5YR 4/6	98	10YR 4/4	2	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus rubra*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	70	Yes	OBL
2. *Rumex crispus*	5	No	FAC
3. *Bromus pubescens*	5	No	FACU
4. *Solidago canadensis*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	70	x 1 =	70
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	100 (A)		175 (B)
Prevalence Index = B/A =			1.75

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0115

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 3/2	100					Loam	
2-20"	10YR 4/1	97	10YR 5/6	3	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0116

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Gleditsia triacanthos*	5	Yes	FAC
2. *Prunus serotina*	15	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Juniperus virginiana*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Lamium purpureum*	5	No	UPL
2. *Valerianella radiata*	5	No	FAC
3. *Daucus carota*	3	No	UPL
4. *Poa pratensis*	15	No	FACU
5. *Plantago rugelii*	5	No	FACU
6. *Schedonorus arundinaceus*	60	Yes	FACU
7. *Oxalis stricta*	3	No	FACU
8. *Trifolium repens*	3	No	FACU
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	99	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
1. *Lonicera japonica*	5	Yes	FAC
2.			
3.			
4.			
	5	= 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	106	x 4 =	424
UPL species	8	x 5 =	40
Column Totals:	129 (A)		509 (B)
Prevalence Index = B/A =			3.95

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0116

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	5YR 4/6	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** Yes X No
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

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)

Surface Water (A1)	X	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)

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
X	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)
	Microtopograpic Relief (D4)
X	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? Yes X No

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	30	Yes	FACW
2. *Celtis laevigata*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Celtis laevigata*	5	Yes	FACW
2. *Erigeron philadelphicus*	3	Yes	FACU
3. *Plantago rugelii*	3	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	11	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 5 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	0	x 3 =	0
FACU species	6	x 4 =	24
UPL species	0	x 5 =	0
Column Totals:	61 (A)		134 (B)
Prevalence Index = B/A =			2.20

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0117

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	5Y 5/1	97	10YR 5/6	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 sloeps, 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0118

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cercis canadensis*	20	Yes	FACU
2. *Celtis laevigata*	20	Yes	FACW
3. *Quercus alba*	20	Yes	FACU
4. *Juniperus virginiana*	10	No	FACU
5. *Ulmus americana*	10	No	FACW
6.			
7.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	5	Yes	FACW
2. *Aralia spinosa*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Osmorhiza longistylis*	10	Yes	FACU
2. *Parthenocissus quinquefolia*	15	Yes	FACU
3. *Symphoricarpos orbiculatus*	10	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	35	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	5	x 3 =	15
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals:	125 (A)		425 (B)
Prevalence Index = B/A =			3.40

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0118

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	5Y 5/1	97	10YR 5/6	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	Yes X	No
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes X** **No**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis palustris*	50	Yes	OBL
2. *Cyperus esculentus*	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	50	x 1 =	50
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		70 (B)
Prevalence Index = B/A =			1.17

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					Silty clay loam	
2-20"	10yr 4/4	95	10yr 5/8	5	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0120

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Poa annua*	50	Yes	FACU
2. *Erigeron philadelphicus*	20	Yes	FACU
3. *Plantago major*	5	No	FACU
4. *Lamium amplexicaule*	5	No	UPL
5. *Geranium carolinianum*	5	No	UPL
6. *Carex blanda*	3	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	88	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	75	x 4 =	300
UPL species	10	x 5 =	50
Column Totals:	88 (A)		359 (B)
Prevalence Index = B/A =			4.08

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 4/4	90	10YR 4/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 1"
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes X** **No**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis palustris*	5	Yes	OBL
2. *Cyperus esculentus*	15	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	20	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	5	x 1 =	5
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	20 (A)		35 (B)
Prevalence Index = B/A =			1.75

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0121

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					Silty clay loam	
2-20"	10YR 4/4	95	10YR 5/8	5	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No** ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis palustris*	10	Yes	OBL
2. *Carex lurida*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	30	x 1 =	30
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		30 (B)
Prevalence Index = B/A =			1.00

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0122

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 5/2	90	10YR 5/8	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Poa annua*	80	Yes	FACU
2. *Trifolium repens*	20	No	FACU
3. *Ambrosia artemisiifolia*	3	No	FACU
4. *Plantago lanceolata*	3	No	UPL
5. *Schedonorus arundinaceus*	3	No	FACU
6. *Daucus carota*	1	No	UPL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	110	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	106	x 4 =	424
UPL species	4	x 5 =	20
Column Totals:	110 (A)		444 (B)
Prevalence Index = B/A =			4.04

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0123

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 3/4	100					Silty clay loam	
2-20"	10YR 3/4	95	10YR 4/6	5	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0124

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Symphoricarpos orbiculatus*	35	Yes	FACU
2. *Festuca rubra*	60	Yes	FACU
3. *Schedonorus arundinaceus*	15	No	FACU
4. *Solidago canadensis*	5	No	FACU
5. *Valerianella radiata*	5	No	FAC
6. *Capsella bursa-pastoris*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	120	x 4 =	480
UPL species	0	x 5 =	0
Column Totals:	125 (A)		495 (B)
Prevalence Index = B/A =			3.96

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0124

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0201

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Gleditsia triacanthos*	40	Yes	FAC
2. *Platanus occidentalis*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa multiflora*	1	No	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	1	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Stellaria media*	60	Yes	UPL
2. *Lamium purpureum*	30	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	40	x 3 =	120
FACU species	1	x 4 =	4
UPL species	90	x 5 =	450
Column Totals:	151 (A)		614 (B)
Prevalence Index = B/A =			4.07

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0201

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 4/3	97	10YR 4/6	3	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	2"
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	40	Yes	FACW
2. *Populus deltoides*	40	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	10	Yes	FACW
2. *Acer negundo*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Solidago gigantea*	20	Yes	FACW
2. *Carex blanda*	10	Yes	FAC
3. *Elymus virginicus*	5	No	FACW
4. *Acer negundo*	5	No	FAC
5. *Lonicera japonica*	5	No	FAC
6. *Viola sororia*	3	No	FAC
7. *Geum canadense*	3	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	51	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 6 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	68	x 3 =	204
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	146 (A)		366 (B)
Prevalence Index = B/A =			2.51

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0202

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 4/3	90	10YR 4/6	10	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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, severly 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

____ Surface Water (A1)	____ Water-Stained Leaves (B9)	____ Surface Soil Cracks (B6)
____ High Water Table (A2)	____ Aquatic Fauna (B13)	____ Sparsely Vegetated Concave Surface (B8)
____ Saturation (A3)	____ True Aquatic Plants (B14)	____ Drainage Patterns (B10)
____ Water Marks (B1)	____ Hydrogen Sulfide Odor (C1)	____ Moss Trim Lines (B16)
____ Sediment Deposits (B2)	____ Oxidized Rhizospheres on Living Roots (C3)	X 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)	X Geomorphic Position (D2)
X Inundation Visible on Aerial Imagery (B7)	____ Other (Explain in Remarks)	____ Shallow Aquitard (D3)
		____ Microtopograpic Relief (D4)
		X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex stipata*	85	Yes	OBL
2. *Asclepias incarnata*	15	No	OBL
3. *Elymus virginicus*	15	No	FACW
4. *Juncus effusus*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	100	x 1 =	100
FACW species	25	x 2 =	50
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	125 (A)		150 (B)
Prevalence Index = B/A =			1.20

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 4/3	95	10YR 4/6	5	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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, severly 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0204

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Solidago altissima*	80	Yes	FACU
2. *Poa pratensis*	30	Yes	FACU
3. *Cerastium fontanum*	5	No	FACU
4. *Vicia grandiflora*	3	No	UPL
5. *Trifolium repens*	3	No	FACU
6. *Allium canadense*	1	No	FACU
7. *Galium tinctorium*	1	No	OBL
8. *Asclepias syriaca*	1	No	FACU
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	124	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	1	x 1 =	1
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	120	x 4 =	480
UPL species	3	x 5 =	15
Column Totals:	124 (A)		496 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/3	97	10YR 4/6	3	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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, severly 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

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

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No** ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Glyceria striata*	90	Yes	OBL
2. *Persicaria lapathifolia*	25	Yes	FACW
3. *Vernonia gigantea*	3	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	118	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	90	x 1 =	90
FACW species	25	x 2 =	50
FAC species	3	x 3 =	9
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	118 (A)		149 (B)
Prevalence Index = B/A =			1.26

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0205

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/3	85	10YR 4/6	15	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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, severly 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0206

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Salix interior*	3	No	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	3	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Setaria faberi*	75	Yes	UPL
2. *Vernonia gigantea*	35	Yes	FAC
3. *Cirsium vulgare*	20	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	130	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	3	x 2 =	6
FAC species	35	x 3 =	105
FACU species	20	x 4 =	80
UPL species	75	x 5 =	375
Column Totals:	133 (A)		566 (B)
Prevalence Index = B/A =			4.26

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/3	90	10YR 4/6	10	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0207

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Phleum pratense*	35	Yes	FACU
2. *Poa pratensis*	30	Yes	FACU
3. *Rosa multiflora*	20	No	FACU
4. *Vicia grandiflora*	20	No	UPL
5. *Rumex crispus*	5	No	FAC
6. *Allium canadense*	5	No	FACU
7. *Solidago altissima*	3	No	FACU
8. *Daucus carota*	1	No	UPL
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	119	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	93	x 4 =	372
UPL species	21	x 5 =	105
Column Totals:	119 (A)		492 (B)
Prevalence Index = B/A =			4.13

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/4	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0208

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	65	Yes	UPL
2. *Lamium amplexicaule*	20	Yes	UPL
3. *Stellaria media*	1	No	UPL
4. *Lamium purpureum*	1	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	87 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	87	x 5 =	435
Column Totals:	87 (A)		435 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/4	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	Yes	No X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

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)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- Microtopograpic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

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: DP0209

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	40	Yes	UPL
2. *Lamium amplexicaule*	15	Yes	UPL
3. *Ambrosia trifida*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	55	x 5 =	275
Column Totals:	60 (A)		290 (B)
Prevalence Index = B/A =			4.83

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/4	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No** ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Salix interior*	30	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	30 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex stipata*	75	Yes	OBL
2. *Alopecurus carolinianus*	10	No	FACW
3. *Persicaria pensylvanica*	10	No	FACW
4. *Rumex crispus*	1	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	96 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	75	x 1 =	75
FACW species	50	x 2 =	100
FAC species	1	x 3 =	3
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	126 (A)		178 (B)
Prevalence Index = B/A =			1.41

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0210

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	7.5YR 4/4	80	7.5YR 4/6	20	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP0211

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	45	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	45 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Poa pratensis*	60	Yes	FACU
2. *Solidago altissima*	15	No	FACU
3. *Lamium purpureum*	5	No	UPL
4. *Carex stipata*	3	No	OBL
5. *Daucus carota*	1	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	84 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	3	x 1 =	3
FACW species	45	x 2 =	90
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	6	x 5 =	30
Column Totals:	129 (A)		423 (B)
Prevalence Index = B/A =			3.28

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP0211

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	55	Yes	FAC
2. *Amaranthus tuberculatus*	15	Yes	FACW
3. *Triticum aestivum*	5	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	75 (A)		220 (B)
Prevalence Index = B/A =			2.93

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	90	7.5YR 4/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	30	Yes	FACU
2. *Agrostis gigantea*	30	Yes	FACW
3. *Carex vulpinoidea*	30	Yes	OBL
4. *Juncus tenuis*	20	No	FAC
5. *Carex molesta*	20	No	FAC
6. *Carex granularis*	5	No	FACW
7. *Vernonia gigantea*	5	No	FAC
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	140	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	30	x 1 =	30
FACW species	35	x 2 =	70
FAC species	45	x 3 =	135
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	140 (A)		355 (B)
Prevalence Index = B/A =			2.54

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	95	10YR 4/4	5	C	PL	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):
Water Table Present?	Yes ____	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):

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: DP1003

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	60	Yes	FACU
2. *Medicago lupulina*	40	Yes	FACU
3. *Trifolium hybridum*	25	No	FACU
4. *Poa pratensis*	10	No	FACU
5. *Erigeron philadelphicus*	5	No	FACU
6. *Bromus arvensis*	5	No	FACU
7. *Dactylis glomerata*	5	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	150	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	150	x 4 =	600
UPL species	0	x 5 =	0
Column Totals:	150 (A)		600 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1003

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/3	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	50	Yes	OBL
2. *Leersia oryzoides*	40	Yes	OBL
3. *Glyceria striata*	20	No	OBL
4. *Impatiens capensis*	10	No	FACW
5. *Schedonorus arundinaceus*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	110	x 1 =	110
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	125 (A)		150 (B)
Prevalence Index = B/A =			1.20

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- _____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- _____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	95	10YR 4/4	5	C	PL	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex frankii*	50	Yes	OBL
2. *Eleocharis obtusa*	50	Yes	OBL
3. *Ranunculus bulbosus*	30	Yes	FAC
4. *Alopecurus carolinianus*	10	No	FACW
5. *Bromus arvensis*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	145	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	100	x 1 =	100
FACW species	10	x 2 =	20
FAC species	30	x 3 =	90
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	145 (A)		230 (B)
Prevalence Index = B/A =			1.59

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1005

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 4/2	90	10YR 4/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	35	Yes	OBL
2. *Scirpus atrovirens*	25	Yes	OBL
3. *Leersia oryzoides*	15	No	OBL
4. *Ranunculus bulbosus*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	75	x 1 =	75
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		90 (B)
Prevalence Index = B/A =			1.13

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1007

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	90	Yes	FACU
2. *Carex mesochorea*	20	No	UPL
3. *Carex frankii*	10	No	OBL
4. *Trifolium hybridum*	10	No	FACU
5. *Juncus tenuis*	10	No	FAC
6. *Carex vulpinoidea*	5	No	OBL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	145 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	15	x 1 =	15
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	100	x 4 =	400
UPL species	20	x 5 =	100
Column Totals:	145 (A)		545 (B)
Prevalence Index = B/A =			3.76

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/3	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2"
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	25	Yes	OBL
2. *Fraxinus pennsylvanica*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	45	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa multiflora*	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Impatiens capensis*	80	Yes	FACW
2. *Scirpus atrovirens*	20	No	OBL
3. *Glyceria striata*	10	No	OBL
4. *Carex vulpinoidea*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	60	x 1 =	60
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	170 (A)		300 (B)
Prevalence Index = B/A =			1.76

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1008

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1009

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	60	Yes	FACU
2. *Ranunculus bulbosus*	40	Yes	FAC
3. *Juncus tenuis*	25	No	FAC
4. *Dactylis glomerata*	5	No	FACU
5. *Hordeum pusillum*	5	No	FAC
6. *Plantago rugelii*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	140 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	70	x 3 =	210
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	140 (A)		490 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/4	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	4"
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	25	Yes	OBL
2. *Fraxinus pennsylvanica*	20	Yes	FACW
3. *Platanus occidentalis*	10	No	FACW
4.			
5.			
6.			
7.			
	55	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	15	Yes	OBL
2. *Sisyrinchium angustifolium*	10	Yes	FACW
3. *Carex frankii*	5	No	OBL
4. *Leersia oryzoides*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	35	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	50	x 1 =	50
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		130 (B)
Prevalence Index = B/A =			1.44

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1010

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1011

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus tenuis*	75	Yes	FAC
2. *Hordeum pusillum*	10	No	FAC
3. *Schedonorus arundinaceus*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	85	x 3 =	255
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	90 (A)		275 (B)
Prevalence Index = B/A =			3.06

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/6	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1012

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	60	Yes	FACU
2. *Carex molesta*	20	Yes	FAC
3. *Carex vulpinoidea*	20	Yes	OBL
4. *Trifolium repens*	15	No	FACU
5. *Ranunculus bulbosus*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	120	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	20	x 1 =	20
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	120 (A)		395 (B)
Prevalence Index = B/A =			3.29

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/3	95	10YR 4/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex molesta*	75	Yes	FAC
2. *Carex vulpinoidea*	30	Yes	OBL
3. *Scirpus atrovirens*	15	No	OBL
4. *Schedonorus arundinaceus*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	130	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	45	x 1 =	45
FACW species	0	x 2 =	0
FAC species	75	x 3 =	225
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	130 (A)		310 (B)
Prevalence Index = B/A =			2.38

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1013

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Scirpus atrovirens*	75	Yes	OBL
2. *Carex vulpinoidea*	20	No	OBL
3. *Glyceria striata*	10	No	OBL
4. *Schedonorus arundinaceus*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	105	x 1 =	105
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	115 (A)		145 (B)
Prevalence Index = B/A =			1.26

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 6/2	90	10YR 5/6	10	C	M	Silt Loam	
6-18"	10yr 5/6	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1015

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	60	Yes	FACU
2. *Dactylis glomerata*	40	Yes	FACU
3. *Trifolium hybridum*	40	Yes	FACU
4. *Plantago lanceolata*	20	No	UPL
5. *Poa pratensis*	10	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	170	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	150	x 4 =	600
UPL species	20	x 5 =	100
Column Totals:	170 (A)		700 (B)
Prevalence Index = B/A =			4.12

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/3	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	25	Yes	OBL
2. *Euthamia graminifolia*	10	Yes	FAC
3. *Impatiens capensis*	10	Yes	FACW
4. *Onoclea sensibilis*	10	Yes	FACW
5. *Scirpus atrovirens*	10	Yes	OBL
6. *Rumex crispus*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	70	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	35	x 1 =	35
FACW species	20	x 2 =	40
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		120 (B)
Prevalence Index = B/A =			1.71

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1016

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	90	10YR 5/6	10	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1017

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	70	Yes	FACU
2. *Trifolium hybridum*	40	Yes	FACU
3. *Medicago lupulina*	20	No	FACU
4. *Poa pratensis*	10	No	FACU
5. *Plantago rugelii*	5	No	FACU
6. *Asclepias tuberosa*	5	No	UPL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	150	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	145	x 4 =	580
UPL species	5	x 5 =	25
Column Totals:	150 (A)		605 (B)
Prevalence Index = B/A =			4.03

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1017

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/4	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Ambrosia trifida*	30	Yes	FAC
2. *Carex vulpinoidea*	20	Yes	OBL
3. *Scirpus atrovirens*	20	Yes	OBL
4. *Xanthium strumarium*	20	Yes	FAC
5. *Leersia oryzoides*	10	No	OBL
6. *Lycopus virginicus*	10	No	OBL
7. *Rumex crispus*	5	No	FAC
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	60	x 1 =	60
FACW species	0	x 2 =	0
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		225 (B)
Prevalence Index = B/A =			1.96

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	90	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1019

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Ranunculus bulbosus*	95	Yes	FAC
2. *Solanum carolinense*	5	No	FACU
3. *Vernonia gigantea*	5	No	FAC
4. *Bromus hordeaceus*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	110	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column Totals:	110 (A)		345 (B)
Prevalence Index = B/A =			3.14

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 5/3	100					Silty Clay	
6-18"	10YR 5/4	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis obtusa*	50	Yes	OBL
2. *Carex vulpinoidea*	30	Yes	OBL
3. *Leersia oryzoides*	20	No	OBL
4. *Ranunculus bulbosus*	10	No	FAC
5. *Hordeum pusillum*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		145 (B)
Prevalence Index = B/A =			1.26

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	95	10YR 4/4	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1021

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

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	70	Yes	FACU
2. *Muhlenbergia schreberi*	10	No	FAC
3. *Solanum carolinense*	5	No	FACU
4. *Persicaria maculosa*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	90	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	10	x 3 =	30
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	90 (A)		340 (B)
Prevalence Index = B/A =			3.78

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/3	95	10YR 5/6	5	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- X High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Leersia oryzoides*	50	Yes	OBL
2. *Carex vulpinoidea*	30	Yes	OBL
3. *Persicaria maculosa*	25	No	FACW
4. *Eleocharis obtusa*	20	No	OBL
5. *Ranunculus bulbosus*	10	No	FAC
6. *Juncus tenuis*	10	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	145	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	100	x 1 =	100
FACW species	25	x 2 =	50
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		210 (B)
Prevalence Index = B/A =			1.45

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	95	10YR 4/4	5	C	M	Loamy Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1023

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

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	70	Yes	FACU
2. *Juncus tenuis*	20	No	FAC
3. *Andropogon virginicus*	20	No	FACU
4. *Saponaria officinalis*	5	No	FACU
5. *Bromus arvensis*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	120 = Total Cover		

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	120 (A)		460 (B)
Prevalence Index = B/A =			3.83

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/4	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus effusus*	80	Yes	FACW
2. *Leersia oryzoides*	10	No	OBL
3. *Juncus tenuis*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	10	x 1 =	10
FACW species	80	x 2 =	160
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1024

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1025

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	60	Yes	FACU
2. *Muhlenbergia schreberi*	30	Yes	FAC
3. *Juncus tenuis*	20	No	FAC
4. *Persicaria maculosa*	10	No	FACW
5. *Xanthium strumarium*	10	No	FAC
6. *Poa pratensis*	10	No	FACU
7. *Trifolium repens*	10	No	FACU
8. *Ranunculus bulbosus*	5	No	FAC
9. *Hordeum pusillum*	5	No	FAC
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	160	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	70	x 3 =	210
FACU species	80	x 4 =	320
UPL species	0	x 5 =	0
Column Totals:	160 (A)		550 (B)
Prevalence Index = B/A =			3.44

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1025

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 5/3	100					silty clay	
4-18"	10YR 5/6	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	25	Yes	OBL
2. *Carex frankii*	20	Yes	OBL
3. *Eleocharis obtusa*	20	Yes	OBL
4. *Scirpus atrovirens*	15	No	OBL
5. *Leersia oryzoides*	10	No	OBL
6. *Ranunculus bulbosus*	10	No	FAC
7. *Persicaria maculosa*	10	No	FACW
8. *Xanthium strumarium*	5	No	FAC
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	90	x 1 =	90
FACW species	10	x 2 =	20
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		155 (B)
Prevalence Index = B/A =			1.35

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- _____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- _____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/2	90	10YR 4/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Salix nigra*	20	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	25	Yes	OBL
2. *Teucrium canadense*	15	Yes	FACW
3. *Persicaria maculosa*	10	No	FACW
4. *Microstegium vimineum*	10	No	FAC
5. *Bromus arvensis*	10	No	FACU
6. *Rumex crispus*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	45	x 1 =	45
FACW species	25	x 2 =	50
FAC species	15	x 3 =	45
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	95 (A)		180 (B)
Prevalence Index = B/A =			1.89

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1027

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	90	10YR 5/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1028

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Platanus occidentalis*	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Gleditsia triacanthos*	100	Yes	FAC
2. *Celtis laevigata*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
	105	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Chaerophyllum procumbens*	40	Yes	FACW
2. *Perilla frutescens*	30	Yes	FACU
3. *Erigeron pulchellus*	20	No	FACU
4. *Phytolacca americana*	10	No	FACU
5. *Conium maculatum*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	100	x 3 =	300
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	250 (A)		720 (B)
Prevalence Index = B/A =			2.88

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1028

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/3	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex frankii*	30	Yes	OBL
2. *Carex vulpinoidea*	20	Yes	OBL
3. *Persicaria maculosa*	20	Yes	FACW
4. *Xanthium strumarium*	10	No	FAC
5. *Ranunculus bulbosus*	10	No	FAC
6. *Ambrosia artemisiifolia*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	50	x 1 =	50
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	95 (A)		170 (B)
Prevalence Index = B/A =			1.79

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1029

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1030

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	20	Yes	FACU
2. *Platanus occidentalis*	10	Yes	FACW
3. *Celtis laevigata*	10	Yes	FACW
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus americana*	75	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	75	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Microstegium vimineum*	40	Yes	FAC
2. *Poa sylvestris*	30	Yes	FACW
3. *Elymus virginicus*	20	Yes	FACW
4. *Impatiens capensis*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	155	x 2 =	310
FAC species	40	x 3 =	120
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	215 (A)		510 (B)
Prevalence Index = B/A =			2.37

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1030

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/3	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Acer rubrum*	70	Yes	FAC
2. *Platanus occidentalis*	20	Yes	FACW
3. *Ulmus americana*	10	No	FACW
4.			
5.			
6.			
7.			
	100 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Euonymus fortunei*	3	No	UPL
2. *Ranunculus bulbosus*	1	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	4 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	71	x 3 =	213
FACU species	0	x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	104 (A)		288 (B)
Prevalence Index = B/A =			2.77

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1031

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/3	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

____ Surface Water (A1)	X 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)
X 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)

Secondary Indicators (minimum of two required)

____ 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)
X Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ Microtopograpic Relief (D4)
X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	70	Yes	OBL
2. *Acer rubrum*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	50	Yes	OBL
2. *Diospyros virginiana*	10	No	FAC
3. *Sambucus nigra*	5	No	FAC
4.			
5.			
6.			
7.			
	65	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Euonymus fortunei*	3	No	UPL
2. *Ranunculus bulbosus*	1	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	4	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	120	x 1 =	120
FACW species	0	x 2 =	0
FAC species	36	x 3 =	108
FACU species	0	x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	159 (A)		243 (B)
Prevalence Index = B/A =			1.53

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1032

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1033

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	20	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Acer rubrum*	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	100	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Acer rubrum*	25	Yes	FAC
2. *Glyceria striata*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	30	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	25	x 1 =	25
FACW species	0	x 2 =	0
FAC species	125	x 3 =	375
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	150 (A)		400 (B)
Prevalence Index = B/A =			2.67

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1033

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 6/1	90	10YR 4/6	10	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):
Water Table Present?	Yes ____	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):

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: DP1034

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Symphoricarpos orbiculatus*	70	Yes	FACU
2. *Lonicera japonica*	20	No	FAC
3. *Toxicodendron radicans*	10	No	FAC
4. *Carex rosea*	5	No	FACU
5. *Galium aparine*	5	No	FACU
6. *Rubus allegheniensis*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals:	115 (A)		430 (B)
Prevalence Index = B/A =			3.74

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/3	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Bidens frondosa*	35	Yes	FACW
2. *Scirpus atrovirens*	20	Yes	OBL
3. *Leersia oryzoides*	15	No	OBL
4. *Microstegium vimineum*	5	No	FAC
5. *Ludwigia alternifolia*	3	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	78	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	35	x 1 =	35
FACW species	38	x 2 =	76
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	78 (A)		126 (B)
Prevalence Index = B/A =			1.62

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1102

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Solidago canadensis*	80	Yes	FACU
2. *Poa pratensis*	15	No	FACU
3. *Mentha arvensis*	10	No	FACW
4. *Carex vulpinoidea*	5	No	OBL
5. *Parthenocissus quinquefolia*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	5	x 1 =	5
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	115 (A)		425 (B)
Prevalence Index = B/A =			3.70

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Clay Loam	
2-16"	10yr 4/4	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	80	Yes	OBL
2. *Scirpus atrovirens*	5	No	OBL
3. *Poa pratensis*	5	No	FACU
4. *Ludwigia alternifolia*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	85	x 1 =	85
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	95 (A)		115 (B)
Prevalence Index = B/A =			1.21

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- _____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- _____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: DP1104

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	80	Yes	OBL
2. *Fraxinus pennsylvanica*	15	No	FACW
3.			
4.			
5.			
6.			
7.			
	95	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus rubra*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Persicaria hydropiper*	60	Yes	OBL
2. *Microstegium vimineum*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	140	x 1 =	140
FACW species	15	x 2 =	30
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	180 (A)		245 (B)
Prevalence Index = B/A =			1.36

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1105

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Microstegium vimineum*	80	Yes	FAC
2. *Lonicera maackii*	5	No	UPL
3. *Persicaria hydropiper*	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	90	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	80	x 3 =	240
FACU species	40	x 4 =	160
UPL species	5	x 5 =	25
Column Totals:	130 (A)		430 (B)
Prevalence Index = B/A =			3.31

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1105

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Clay Loam	
2-16"	10YR 4/4	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Sambucus nigra*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	40	Yes	OBL
2. *Scirpus pendulus*	20	Yes	OBL
3. *Poa pratensis*	20	Yes	FACU
4. *Carex hystericina*	10	No	OBL
5. *Teucrium canadense*	5	No	FACW
6. *Ludwigia alternifolia*	5	No	FACW
7. *Microstegium vimineum*	5	No	FAC
8. *Platanus occidentalis*	5	No	FACW
9. *Salix nigra*	5	No	OBL
10. *Boehmeria cylindrica*	5	No	FACW
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	120	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	75	x 1 =	75
FACW species	20	x 2 =	40
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	125 (A)		225 (B)
Prevalence Index = B/A =			1.80

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1107

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Schedonorus arundinaceus*	30	Yes	FACU
2. *Festuca rubra*	30	Yes	FACU
3. *Sambucus nigra*	20	Yes	FAC
4. *Allium canadense*	10	No	FACU
5. *Rumex crispus*	5	No	FAC
6. *Calystegia sepium*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	100 (A)		370 (B)
Prevalence Index = B/A =			3.70

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1107

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 4/4	95	10YR 4/6	5	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1108

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Setaria viridis*	40	Yes	UPL
2. *Poa pratensis*	40	Yes	FACU
3. *Festuca rubra*	30	Yes	FACU
4. *Andropogon virginicus*	15	No	FACU
5. *Juncus tenuis*	10	No	FAC
6. *Carex tribuloides*	10	No	FACW
7. *Plantago lanceolata*	3	No	UPL
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	148	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	10	x 3 =	30
FACU species	85	x 4 =	340
UPL species	43	x 5 =	215
Column Totals:	148 (A)		605 (B)
Prevalence Index = B/A =			4.09

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1108

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/4	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes X	No ____	Depth (inches):	4"
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Scirpus pendulus*	70	Yes	OBL
2. *Carex tribuloides*	20	No	FACW
3. *Juncus tenuis*	10	No	FAC
4. *Carex vulpinoidea*	5	No	OBL
5. *Hypericum mutilum*	5	No	FACW
6. *Eleocharis obtusa*	5	No	OBL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	80	x 1 =	80
FACW species	25	x 2 =	50
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		160 (B)
Prevalence Index = B/A =			1.39

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes X	No ____	Depth (inches):	4"
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Scirpus atrovirens*	60	Yes	OBL
2. *Carex tribuloides*	30	Yes	FACW
3. *Carex vulpinoidea*	5	No	OBL
4. *Eleocharis obtusa*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	70	x 1 =	70
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		130 (B)
Prevalence Index = B/A =			1.30

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1111

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Bromus arvensis*	30	Yes	FACU
2. *Solidago altissima*	25	Yes	FACU
3. *Andropogon virginicus*	15	No	FACU
4. *Valerianella umbilicata*	15	No	FAC
5. *Rubus occidentalis*	10	No	UPL
6. *Taraxacum officinale*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	75	x 4 =	300
UPL species	10	x 5 =	50
Column Totals:	100 (A)		395 (B)

Prevalence Index = B/A = 3.95

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1111

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex tribuloides*	50	Yes	FACW
2. *Carex vulpinoidea*	30	Yes	OBL
3. *Persicaria hydropiper*	20	No	OBL
4. *Microstegium vimineum*	5	No	FAC
5. *Festuca rubra*	5	No	FACU
6. *Leersia oryzoides*	3	No	OBL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	113	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	53	x 1 =	53
FACW species	50	x 2 =	100
FAC species	5	x 3 =	15
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	113 (A)		188 (B)
Prevalence Index = B/A =			1.66

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1112

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					Clay Loam	
2-16"	10YR 4/3	80	5YR 5/8	20	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1113

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carya ovata*	40	Yes	FACU
2. *Celtis laevigata*	25	Yes	FACW
3. *Quercus palustris*	20	No	FACW
4. *Carya cordiformis*	20	No	FACU
5. *Liquidambar styraciflua*	10	No	FAC
6.			
7.			
	115	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cercis canadensis*	30	Yes	FACU
2. *Ulmus rubra*	30	Yes	FAC
3. *Symphoricarpos orbiculatus*	30	Yes	FACU
4. *Fraxinus quadrangulata*	20	No	UPL
5.			
6.			
7.			
	110	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Solidago altissima*	40	Yes	FACU
2. *Elymus canadensis*	30	Yes	FACU
3. *Microstegium vimineum*	10	No	FAC
4. *Poa pratensis*	10	No	FACU
5. *Impatiens capensis*	5	No	FACW
6. *Elymus villosus*	5	No	FACU
7. *Carex davisii*	5	No	FAC
8. *Verbesina alternifolia*	5	No	FAC
9. *Cryptotaenia canadensis*	3	No	FAC
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	113	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	63	x 3 =	189
FACU species	205	x 4 =	820
UPL species	20	x 5 =	100
Column Totals:	338 (A)		1209 (B)
Prevalence Index = B/A =			3.58

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					Silty Clay Loam	
2-16"	10yr 4/4	95	10YR 4/6	5	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1114

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	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	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	60	x 5 =	300
Column Totals:	60 (A)		300 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1114

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 4/2	90	10YR 4/4	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Glyceria striata*	30	Yes	OBL
2. *Typha X glauca*	20	Yes	OBL
3. *Leersia oryzoides*	15	No	OBL
4. *Scirpus atrovirens*	10	No	OBL
5. *Juncus effusus*	5	No	FACW
6. *Boehmeria cylindrica*	3	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	83 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	75	x 1 =	75
FACW species	8	x 2 =	16
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	83 (A)		91 (B)
Prevalence Index = B/A =			1.10

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/2	95	10YR 5/6	5	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1116

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	50	Yes	UPL
2. *Solidago altissima*	20	Yes	FACU
3. *Bromus arvensis*	20	Yes	FACU
4. *Apocynum cannabinum*	5	No	FACU
5. *Packera glabella*	5	No	OBL
6. *Erigeron canadensis*	3	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	103	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	48	x 4 =	192
UPL species	50	x 5 =	250
Column Totals:	103 (A)		447 (B)
Prevalence Index = B/A =			4.34

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Clay Loam	
2-16"	10YR 4/4	95	10YR 4/6	5	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	70	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	70	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Sambucus nigra*	10	Yes	FAC
2. *Fraxinus pennsylvanica*	4	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	14	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Impatiens capensis*	80	Yes	FACW
2. *Bromus arvensis*	15	No	FACU
3. *Leersia oryzoides*	5	No	OBL
4. *Juncus effusus*	5	No	FACW
5. *Carex frankii*	3	No	OBL
6. *Carex hystericina*	3	No	OBL
7. *Galium tinctorium*	3	No	OBL
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	114	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	84	x 1 =	84
FACW species	89	x 2 =	178
FAC species	10	x 3 =	30
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	198 (A)		352 (B)
Prevalence Index = B/A =			1.78

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1117

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/1	90	10YR 5/6	10	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	70	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Sambucus nigra*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Impatiens capensis*	60	Yes	FACW
2. *Glyceria striata*	20	No	OBL
3. *Leersia oryzoides*	15	No	OBL
4. *Juncus effusus*	5	No	FACW
5. *Carex vulpinoidea*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	110	x 1 =	110
FACW species	65	x 2 =	130
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	185 (A)		270 (B)
Prevalence Index = B/A =			1.46

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1118

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/1	90	10YR 5/6	10	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus rubra*	30	Yes	FAC
2. *Quercus alba*	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus rubra*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Glyceria striata*	10	Yes	OBL
2. *Impatiens capensis*	5	Yes	FACW
3. *Scirpus atrovirens*	5	Yes	OBL
4. *Toxicodendron radicans*	5	Yes	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	25	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	5	x 2 =	10
FAC species	50	x 3 =	150
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	100 (A)		295 (B)
Prevalence Index = B/A =			2.95

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1119

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 4/4	100					Silt Loam	
4-16"	10YR 5/2	95	10YR 5/6	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1120

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	80	Yes	FACU
2. *Quercus rubra*	30	Yes	FACU
3. *Carya laciniosa*	30	Yes	FAC
4.			
5.			
6.			
7.			
	140	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Symphoricarpos orbiculatus*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Podophyllum peltatum*	40	Yes	FACU
2. *Sanicula odorata*	5	No	FACU
3. *Galium tinctorium*	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 5 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	185	x 4 =	740
UPL species	0	x 5 =	0
Column Totals:	220 (A)		835 (B)
Prevalence Index = B/A =			3.80

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1120

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Silty Clay Loam	
2-16"	10YR 4/4	100					Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	10	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Carex vulpinoidea*	10	Yes	OBL
2. *Carex tribuloides*	10	Yes	FACW
3. *Leersia oryzoides*	5	No	OBL
4. *Persicaria lapathifolia*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	30	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	25	x 1 =	25
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	40 (A)		55 (B)
Prevalence Index = B/A =			1.38

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1121

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1"	10YR 4/4	100					Clay loam	
1-16"	10YR 5/2	90	10YR 4/6	10	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1122

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	50	Yes	UPL
2. *Solidago altissima*	50	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	50	x 5 =	250
Column Totals:	100 (A)		450 (B)
Prevalence Index = B/A =			4.50

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	10YR 4/4	100					Clay loam	
3-16"	10YR 4/3	70	10YR 4/4	30	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1123

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	100	Yes	FACW
2. *Acer negundo*	20	No	FAC
3.			
4.			
5.			
6.			
7.			
	120	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Celtis laevigata*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Persicaria hydropiper*	80	Yes	OBL
2. *Laportea canadensis*	15	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	80	x 1 =	80
FACW species	115	x 2 =	230
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	230 (A)		415 (B)
Prevalence Index = B/A =			1.80

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1123

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Silt Loam	
2-16"	10YR 4/4	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1124

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus rubra*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Juglans nigra*	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Teucrium canadense*	80	Yes	FACW
2. *Asclepias syriaca*	20	No	FACU
3. *Rubus allegheniensis*	15	No	FACU
4. *Verbesina alternifolia*	10	No	FAC
5. *Rumex crispus*	5	No	FAC
6. *Ambrosia trifida*	5	No	FAC
7. *Bromus arvensis*	3	No	FACU
8. *Galium aparine*	3	No	FACU
9. *Persicaria hydropiper*	3	No	OBL
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	144	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	3	x 1 =	3
FACW species	80	x 2 =	160
FAC species	30	x 3 =	90
FACU species	51	x 4 =	204
UPL species	0	x 5 =	0
Column Totals:	164 (A)		457 (B)
Prevalence Index = B/A =			2.79

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1124

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Silty Clay Loam	
2-16"	10yr 4/4	100					Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1125

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Gleditsia triacanthos*	15	Yes	FAC
2. *Juglans nigra*	5	Yes	FACU
3. *Celtis laevigata*	5	Yes	FACW
4. *Ulmus rubra*	5	Yes	FAC
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Bromus arvensis*	60	Yes	FACU
2. *Solidago altissima*	20	Yes	FACU
3. *Teucrium canadense*	20	Yes	FACW
4. *Asclepias syriaca*	15	No	FACU
5. *Chaerophyllum tainturieri*	15	No	FAC
6. *Verbesina alternifolia*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	135	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	40	x 3 =	120
FACU species	115	x 4 =	460
UPL species	0	x 5 =	0
Column Totals:	180 (A)		630 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1125

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					Silty clay loam	
2-16"	10YR 4/4	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1126

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	70	Yes	FACW
2. *Liquidambar styraciflua*	20	Yes	FAC
3. *Celtis laevigata*	10	No	FACW
4.			
5.			
6.			
7.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus americana*	20	Yes	FACW
2. *Symphoricarpos orbiculatus*	10	Yes	FACU
3. *Fraxinus americana*	5	No	FACU
4.			
5.			
6.			
7.			
	35	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Impatiens capensis*	40	Yes	FACW
2. *Microstegium vimineum*	20	Yes	FAC
3. *Parthenocissus quinquefolia*	15	Yes	FACU
4. *Ageratina altissima*	10	No	FACU
5. *Carex davisii*	10	No	FAC
6. *Rosa palustris*	10	No	OBL
7. *Sanicula odorata*	10	No	FACU
8. *Erigeron pulchellus*	5	No	FACU
9. *Persicaria pensylvanica*	5	No	FACW
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	145	x 2 =	290
FAC species	50	x 3 =	150
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	260 (A)		670 (B)
Prevalence Index = B/A =			2.58

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1126

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					silty clay loam	
2-16"	10YR 4/4	100					silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No** ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	5	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Leersia oryzoides*	40	Yes	OBL
2. *Scirpus pendulus*	25	Yes	OBL
3. *Carex lurida*	10	No	OBL
4. *Juncus effusus*	5	No	FACW
5. *Carex typhina*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	80	x 1 =	80
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		100 (B)
Prevalence Index = B/A =			1.11

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1127

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1"	10YR 4/3	100					Silty Clay Loam	
1-16"	10yr 5/2	80	10YR 5/6	20	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1128

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	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	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	60	x 5 =	300
Column Totals:	60 (A)		300 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1128

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100					silty clay loam	
2-16"	10yr 4/4	100					silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	60	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Salix nigra*	15	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Leersia oryzoides*	25	Yes	OBL
2. *Platanus occidentalis*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	30	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	100	x 1 =	100
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		110 (B)
Prevalence Index = B/A =			1.05

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1129

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1"	10YR 4/3	100					Silty Clay Loam	
1-16"	10YR 5/2	80	10YR 5/6	20	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	25	Yes	FAC
2. *Persicaria hydropiper*	25	Yes	OBL
3. *Carex tribuloides*	15	Yes	FACW
4. *Carex vulpinoidea*	15	Yes	OBL
5. *Ambrosia artemisiifolia*	15	Yes	FACU
6. *Juncus tenuis*	15	Yes	FAC
7. *Leersia oryzoides*	10	No	OBL
8. *Gratiola virginiana*	10	No	OBL
9. *Eleocharis obtusa*	10	No	OBL
10. *Scirpus pendulus*	5	No	OBL
11. *Asclepias incarnata*	5	No	OBL
12. *Sium suave*	5	No	OBL
13. *Juncus effusus*	3	No	FACW
14 *Xanthium strumarium*	3	No	FAC
15			
16			
17			
18			
19			
20			
	161	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	85	x 1 =	85
FACW species	18	x 2 =	36
FAC species	43	x 3 =	129
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	161 (A)		310 (B)
Prevalence Index = B/A =			1.93

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/1	95	10YR 5/6	5	c	m	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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.): 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1131

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	70	Yes	UPL
2. *Echinochloa crus-galli*	20	No	FAC
3. *Ambrosia artemisiifolia*	10	No	FACU
4. *Acalypha rhomboidea*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	110 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	70	x 5 =	350
Column Totals:	110 (A)		490 (B)
Prevalence Index = B/A =			4.45

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/2	97	10YR 4/6	3	c	m	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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: 37.144649 | 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	5	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Bidens frondosa*	25	Yes	FACW
2. *Carex vulpinoidea*	20	Yes	OBL
3. *Echinochloa crus-galli*	15	No	FAC
4. *Carex shortiana*	10	No	FAC
5. *Sium suave*	5	No	OBL
6. *Juncus effusus*	5	No	FACW
7. *Solidago altissima*	5	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	30	x 1 =	30
FACW species	30	x 2 =	60
FAC species	25	x 3 =	75
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	90 (A)		185 (B)
Prevalence Index = B/A =			2.06

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/1	95	10YR 5/6	5	c	m	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	5	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	5	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Elymus virginicus*	20	Yes	FACW
2. *Sium suave*	10	Yes	OBL
3. *Glyceria striata*	10	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	25	x 1 =	25
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	45 (A)		65 (B)
Prevalence Index = B/A =			1.44

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 5/1	95	10YR 5/6	5	c	m	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Galium aparine*	20	Yes	FACU
2. *Persicaria maculosa*	5	Yes	FACW
3. *Ambrosia trifida*	5	Yes	FAC
4. *Carex blanda*	5	Yes	FAC
5. *Viola sororia*	5	Yes	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	15	x 3 =	45
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	40 (A)		135 (B)
Prevalence Index = B/A =			3.38

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: Lindside 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	50	Yes	FAC
2. *Packera glabella*	10	No	OBL
3. *Persicaria maculosa*	5	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	10	x 1 =	10
FACW species	5	x 2 =	10
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		170 (B)
Prevalence Index = B/A =			2.62

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

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

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Carex normalis*	70	Yes	FACW
2. *Persicaria pensylvanica*	20	No	FACW
3. *Echinochloa crus-galli*	20	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	110	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110 (A)		240 (B)
Prevalence Index = B/A =			2.18

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1204

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Triticum aestivum*	100	Yes	UPL
2. *Poa annua*	1	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	101	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
1. *Toxicodendron radicans*	5	Yes	FAC
2.			
3.			
4.			
	5	= 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	1	x 4 =	4
UPL species	100	x 5 =	500
Column Totals:	106 (A)		519 (B)
Prevalence Index = B/A =			4.90

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	7.5YR 5/2	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	5	Yes	FAC
2. *Packera glabella*	5	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	10 (A)		20 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	7.5YR 5/2	85	7.5YR 5/8	15	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		90 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1206

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	7.5YR 5/2	85	7.5YR 5/8	15	C	M	SiltY Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	20	Yes	FAC
2. *Packera glabella*	5	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	25	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	25 (A)		65 (B)
Prevalence Index = B/A =			2.60

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1207

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	70	Yes	FAC
2. *Amaranthus tuberculatus*	10	No	FACW
3. *Packera glabella*	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	5	x 1 =	5
FACW species	10	x 2 =	20
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		235 (B)
Prevalence Index = B/A =			2.76

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1208

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1209

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	40	Yes	FACW
2. *Acer saccharum*	30	Yes	FACU
3. *Aesculus glabra*	25	Yes	FACU
4.			
5.			
6.			
7.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Lindera benzoin*	30	Yes	FAC
2. *Ptelea trifoliata*	10	Yes	FAC
3. *Aesculus glabra*	5	No	FACU
4.			
5.			
6.			
7.			
	45	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Sanicula odorata*	40	Yes	FACU
2. *Poa sylvestris*	25	Yes	FACW
3. *Galium aparine*	20	No	FACU
4. *Elymus villosus*	10	No	FACU
5. *Carex grayi*	10	No	FACW
6. *Impatiens capensis*	5	No	FACW
7. *Persicaria virginiana*	5	No	FAC
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	115	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	45	x 3 =	135
FACU species	130	x 4 =	520
UPL species	0	x 5 =	0
Column Totals:	255 (A)		815 (B)
Prevalence Index = B/A =			3.20

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1209

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 3/2	100					Silt Loam	
4-16"	7.5YR 5/6	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):
Water Table Present?	Yes ____	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):

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: DP1210

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	40	Yes	FACW
2. *Acer saccharum*	30	Yes	FACU
3. *Aesculus glabra*	25	No	FACU
4. *Acer negundo*	25	No	FAC
5. *Maclura pomifera*	10	No	UPL
6.			
7.			
	130	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Symphoricarpos orbiculatus*	30	Yes	FACU
2. *Aesculus glabra*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
	35	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Sanicula odorata*	30	Yes	FACU
2. *Poa sylvestris*	25	Yes	FACW
3. *Impatiens capensis*	15	Yes	FACW
4. *Osmorhiza claytonii*	5	No	FACU
5. *Toxicodendron radicans*	5	No	FAC
6. *Smilax hispida*	5	No	FAC
7. *Persicaria virginiana*	5	No	FAC
8. *Urtica dioica*	5	No	FACU
9. *Verbesina alternifolia*	5	No	FAC
10. *Carex grisea*	5	No	FACU
11. *Viola canadensis*	5	No	FAC
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	110	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	50	x 3 =	150
FACU species	135	x 4 =	540
UPL species	10	x 5 =	50
Column Totals:	275 (A)		900 (B)
Prevalence Index = B/A =			3.27

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1210

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 3/2	100					Silt Loam	
4-16"	7.5YR 5/6	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	60	Yes	FAC
2. *Amaranthus tuberculatus*	10	No	FACW
3. *Triticum aestivum*	1	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	71	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	71 (A)		205 (B)
Prevalence Index = B/A =			2.89

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1211

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 6/1	80	10YR 4/6	20	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	50	Yes	FACW
2. *Maclura pomifera*	25	Yes	UPL
3. *Acer negundo*	25	Yes	FAC
4. *Ulmus americana*	10	No	FACW
5.			
6.			
7.			
	110	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa multiflora*	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Euonymus fortunei*	90	Yes	UPL
2. *Impatiens capensis*	10	No	FACW
3. *Arisaema dracontium*	5	No	FACW
4. *Lactuca biennis*	5	No	FACU
5. *Poa sylvestris*	2	No	FACW
6. *Carex grisea*	2	No	FACU
7.	2	No	
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	116	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	77	x 2 =	154
FAC species	25	x 3 =	75
FACU species	17	x 4 =	68
UPL species	115	x 5 =	575
Column Totals:	234 (A)		872 (B)
Prevalence Index = B/A =			3.73

Hydrophytic Vegetation Indicators:

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1212

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	10YR 5/3	100					Silt Loam	
3-16"	10YR 4/6						Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	60	Yes	FAC
2. *Triticum aestivum*	1	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	61	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	61 (A)		185 (B)
Prevalence Index = B/A =			3.03

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 4/2	80	10YR 4/6	20	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	10	Yes	OBL
2. *Fraxinus pennsylvanica*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	10	Yes	OBL
2. *Acer negundo*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Typha X glauca*	35	Yes	OBL
2. *Leersia oryzoides*	25	Yes	OBL
3. *Solidago gigantea*	10	No	FACW
4. *Symphyotrichum puniceum*	10	No	OBL
5. *Persicaria pensylvanica*	5	No	FACW
6. *Carex typhina*			FACW
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	85	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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: 6 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	25	x 2 =	50
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		155 (B)
Prevalence Index = B/A =			1.29

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1214

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 4/2	80	10YR 3/6	20	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	60	Yes	FAC
2. *Sida spinosa*	5	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	65 (A)		205 (B)
Prevalence Index = B/A =			3.15

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

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: DP1216

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis occidentalis*	35	Yes	FACU
2. *Juniperus virginiana*	25	Yes	FACU
3. *Prunus serotina*	25	Yes	FACU
4. *Juglans nigra*	10	No	FACU
5. *Diospyros virginiana*	5	No	FAC
6.			
7.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Juglans nigra*	5	Yes	FACU
2. *Symphoricarpos orbiculatus*	5	Yes	FACU
3.	g	Yes	
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Verbesina alternifolia*	25	Yes	FAC
2. *Lonicera japonica*	20	Yes	FAC
3. *Toxicodendron radicans*	15	Yes	FAC
4. *Poa sylvestris*	15	Yes	FACW
5. *Bromus inermis*	10	No	UPL
6. *Elymus canadensis*	10	No	FACU
7. *Sanicula odorata*	10	No	FACU
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	65	x 3 =	195
FACU species	125	x 4 =	500
UPL species	10	x 5 =	50
Column Totals:	215 (A)		775 (B)
Prevalence Index = B/A =			3.60

Hydrophytic Vegetation Indicators:

_ Rapid Test for Hydrophytic Vegetation

_ Dominance Test is >50%

_ Prevalence Index is ≤ 3.0[1]

_ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1216

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 4/2	100					Silt Loam	
6-16"	10yr 4/1	85	10YR 5/6	15	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12)
- ___ Umbric Surface (F13)
- ___ Red Parent Material (F21)

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	65	Yes	FACW
2. *Ulmus americana*	10	No	FACW
3.			
4.			
5.			
6.			
7.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cephalanthus occidentalis*	40	Yes	OBL
2. *Cornus racemosa*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Bidens frondosa*	25	Yes	FACW
2. *Carex cristatella*	20	Yes	FACW
3. *Solidago gigantea*	20	Yes	FACW
4. *Glyceria striata*	15	No	OBL
5. *Leersia virginica*	15	No	FACW
6. *Scirpus atrovirens*	10	No	OBL
7. *Carex vulpinoidea*	10	No	OBL
8. *Carex typhina*	5	No	FACW
9. *Carex comosa*	5	No	OBL
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	125	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
1. *Toxicodendron radicans*	10	Yes	FAC
2.			
3.			
4.			
	10	= Total Cover	

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)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	160	x 2 =	320
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	260 (A)		460 (B)
Prevalence Index = B/A =			1.77

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1217

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 6/1	80	5YR 3/4	20	C	M	SiltY clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus palustris*	50	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Persicaria lapathifolia*	40	Yes	FACW
2. *Echinochloa crus-galli*	10	No	FAC
3. *Glyceria striata*	5	No	OBL
4. *Bidens frondosa*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	60	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
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	5	x 1 =	5
FACW species	95	x 2 =	190
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110 (A)		225 (B)
Prevalence Index = B/A =			2.05

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1218

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 5/1	75	10YR 3/6	25	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Celtis laevigata*	35	Yes	FACW
2. *Ulmus americana*	35	Yes	FACW
3. *Fraxinus pennsylvanica*	20	Yes	FACW
4. *Robinia pseudoacacia*	5	No	FACU
5.			
6.			
7.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Fraxinus pennsylvanica*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	30	Yes	FAC
2. *Leersia virginica*	15	Yes	FACW
3. *Scirpus atrovirens*	5	No	OBL
4. *Packera glabella*	5	No	OBL
5. *Acer negundo*	5	No	FAC
6. *Bidens frondosa*	5	No	FACW
7. *Toxicodendron radicans*	5	No	FAC
8. *Alisma subcordatum*	2	No	OBL
9. *Poa annua*	2	No	FACU
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	74	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
1. *Toxicodendron radicans*			FAC
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: 6 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	12	x 1 =	12
FACW species	130	x 2 =	260
FAC species	40	x 3 =	120
FACU species	7	x 4 =	28
UPL species	0	x 5 =	0
Column Totals:	189 (A)		420 (B)
Prevalence Index = B/A =			2.22

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1219

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Echinochloa crus-galli*	60	Yes	FAC
2. *Triticum aestivum*	1	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	61	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	61 (A)		185 (B)
Prevalence Index = B/A =			3.03

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1220

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 5/1	85	5YR 5/6	15	c	m	Sandy Loam	
8-16"	10YR 6/1	80	5YR 5/6	20	c	m	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	5	Yes	FAC
2. *Liquidambar styraciflua*	5	Yes	FAC
3. *Quercus palustris*	5	Yes	FACW
4.			
5.			
6.			
7.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ulmus americana*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Verbesina alternifolia*	20	Yes	FAC
2. *Carex lupuliformis*	20	Yes	FACW
3. *Carex vulpinoidea*	10	Yes	OBL
4. *Leersia virginica*	10	Yes	FACW
5. *Persicaria maculosa*	10	Yes	FACW
6. *Triticum aestivum*	10	Yes	UPL
7. *Echinochloa crus-galli*	10	Yes	FAC
8. *Juncus tenuis*	5	No	FAC
9. *Sida spinosa*	5	No	UPL
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
1.			
2.			
3.			
4.			
		= Total Cover	

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)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	55	x 2 =	110
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	15	x 5 =	75
Column Totals:	125 (A)		330 (B)
Prevalence Index = B/A =			2.64

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1221

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 6/1	85	10YR 5/6	15	C	M	Silt Loam	
8-16"	10YR 6/1	60	7.5YR 3/4	40	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	
Water Table Present?	Yes ____	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	surface

Wetland Hydrology Present? **Yes X** **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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carpinus caroliniana*	35	Yes	FAC
2. *Celtis laevigata*	35	Yes	FACW
3. *Quercus palustris*	25	Yes	FACW
4. *Liquidambar styraciflua*	20	No	FAC
5. *Carya ovata*	5	No	FACU
6.			
7.			
	120	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Fraxinus pennsylvanica*	10	Yes	FACW
2. *Ulmus americana*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Glyceria striata*	60	Yes	OBL
2. *Microstegium vimineum*	20	Yes	FAC
3. *Carex normalis*	20	Yes	FACW
4. *Impatiens capensis*	10	No	FACW
5. *Poa sylvestris*	10	No	FACW
6. *Leersia virginica*	5	No	FACW
7. *Solidago gigantea*	5	No	FACW
8. *Elymus virginicus*	5	No	FACW
9. *Sanicula odorata*	5	No	FACU
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	140	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	60	x 1 =	60
FACW species	135	x 2 =	270
FAC species	75	x 3 =	225
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	280 (A)		595 (B)
Prevalence Index = B/A =			2.13

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1222

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 6/1	80	5YR 4/4	20	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X 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)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopograpic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Fraxinus pennsylvanica*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Leersia oryzoides*	40	Yes	OBL
2. *Cicuta maculata*	20	Yes	OBL
3. *Carex molesta*	15	No	FAC
4. *Carex frankii*	10	No	OBL
5. *Hibiscus laevis*	5	No	OBL
6. *Carex cristatella*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14			
15			
16			
17			
18			
19			
20			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft.)			
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:	
OBL species	75	x 1 =	75
FACW species	10	x 2 =	20
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		140 (B)
Prevalence Index = B/A =			1.40

Hydrophytic Vegetation Indicators:

- X Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1223

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 4/2	85	5YR 4/6	15	C	M	Silt Loam	
5-16"	10YR 6/1	75	5YR 4/6	25	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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: 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 X	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:		

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)

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

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes X** **No ____**

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: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus palustris*	45	Yes	FACW
2. *Fraxinus pennsylvanica*	30	Yes	FACW
3. *Celtis laevigata*	15	No	FACW
4. *Salix interior*	10	No	FACW
5.			
6.			
7.			
	100	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft.)			
1. *Juncus tenuis*	30	Yes	FAC
2. *Lonicera japonica*	15	Yes	FAC
3. *Carex comosa*	10	Yes	OBL
4. *Carex tribuloides*	10	Yes	FACW
5. *Impatiens capensis*	10	Yes	FACW
6. *Rumex crispus*	5	No	FAC
7. *Galium aparine*	5	No	FACU
8. *Carex normalis*	5	No	FACW
9. *Urtica dioica*	5	No	FACU
10. *Carex vulpinoidea*	5	No	OBL
11. *Solidago gigantea*	5	No	FACW
12. *Microstegium vimineum*	5	No	FAC
13.			
14			
15			
16			
17			
18			
19			
20			
	110	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft.)			
1.			
2.			
3.			
4.			
		= Total Cover	

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)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	130	x 2 =	260
FAC species	55	x 3 =	165
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	210 (A)		480 (B)
Prevalence Index = B/A =			2.29

Hydrophytic Vegetation Indicators:

	Rapid Test for Hydrophytic Vegetation
X	Dominance Test is >50%
X	Prevalence Index is ≤ 3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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: DP1224

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1"	10YR 5/2	100					Silt Loam	
1-16"	10yr 7/1	70	7.5YR 5/6	30	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

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

[3]Indicators 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:

Caldwell Solar, Caldwell County, Kentucky

APPENDIX D

WETLAND FORMS

KY-WRAM Rating Form Version 3.0	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
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**	
Actual Wetland Size Estimate: 1.31 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. 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.**		**Score**
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

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: w001	Rater(s): BRH	Date: 4/6/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	35	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	4	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	1	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	60	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 7

Site: w001	**Rater(s):** BRH	**Date:** 4/6/20

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 *other* 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.
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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	4
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 15	**Subtotal** 22

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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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☑	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☑	clearcutting	☐	☐	Herbicide or chemical treatment	☑	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	3
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.)** 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**: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**: 5

- ☐ 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]**

5c. Low-Quality Wetland — **Score**: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 5	**Subtotal** 36

***Score can be negative**

Site: w001	Rater(s): BRH	Date: 4/6/20

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			
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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)	**OR →**	**Secondary Indicators (must have 2)**
☑ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☑ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

standing water present

Subtotal 2

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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. 0

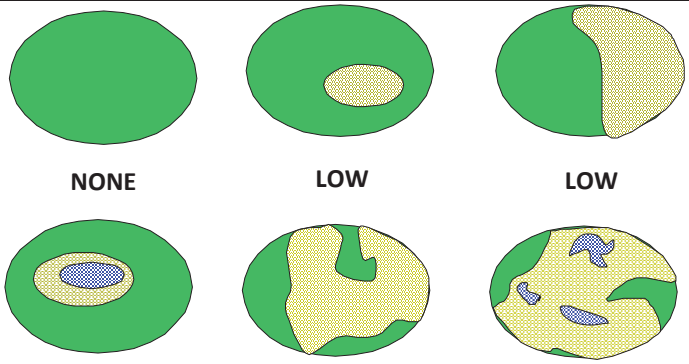
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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

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.

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	**Score** 0

2. Large Woody Debris (LWD). per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)

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	**Score** 0

3. Large Snags (≥12 inches DBH).

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	**Score** 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)**.

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	**Score** 2

6e. Microtopographic Features Score	2

Metric 6 Total: add 6a – 6e **(20 points max.)**	**Total Score** 4

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	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): 0.06 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: w002	**Rater(s):** BRH	**Date:** 4/6/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w002	Rater(s): BRH	Date: 4/6/20

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:	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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	Land Use Types:		Estimate % of each category **here** ↓		Score
Very Low:	☐ mature growth forest	☐ other wetland, lake, stream, river	4	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	6	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	8	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	72	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 7

Site: w002	**Rater(s):** BRH	**Date:** 4/6/20

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 19	**Subtotal** 26

Site: w002	Rater(s): BRH	Date: 4/6/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	4
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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.)** 16	**Subtotal** 42

Site: w002	Rater(s): BRH	Date: 4/6/20

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**: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**: 0

- ☐ 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]**

5c. Low-Quality Wetland — **Score**: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 42

***Score can be negative**

Site: w002	Rater(s): BRH	Date: 4/6/20

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		
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 1

Site: w002	Rater(s): BRH	Date: 4/6/20

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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w002	Rater(s): BRH	Date: 4/6/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

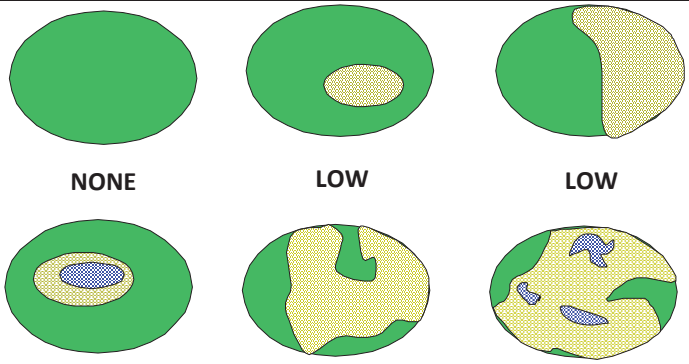
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w002	**Rater(s):** BRH	**Date:** 4/6/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	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): 0.49 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: w003	**Rater(s):** BRH	**Date:** 4/6/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
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**	
Actual Wetland Size Estimate: 0.49 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. 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.**		**Score**
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	55	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	45	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 13

Site: w003	**Rater(s):** BRH	**Date:** 4/6/20

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 *other* 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.

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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	3
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 22	**Subtotal** 35

Site: w003	Rater(s): BRH	Date: 4/6/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☑	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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** 49

Site: w003	Rater(s): BRH	Date: 4/6/20

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**

- ☐ 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: 0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**

- ☐ 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: 8

5c. Low-Quality Wetland — **Score**

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: 0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 57

***Score can be negative**

Site: w003	Rater(s): BRH	Date: 4/6/20

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			
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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	6

Subtotal 6

Site: w003	Rater(s): BRH	Date: 4/6/20

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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w003	Rater(s): BRH	Date: 4/6/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

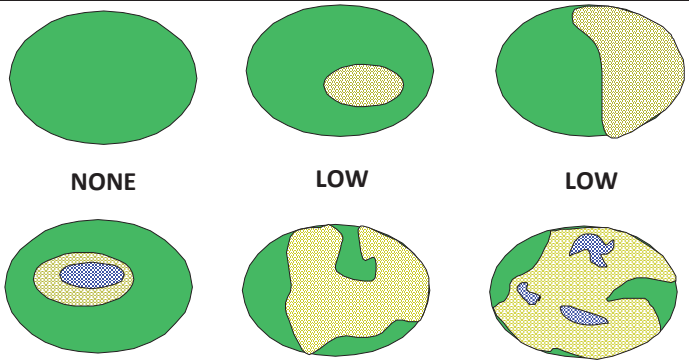
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w003	Rater(s): BRH	Date: 4/6/20

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

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	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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w004	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): 0.05 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: w004	**Rater(s):** BRH	**Date:** 4/6/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.49 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w004	Rater(s): BRH	Date: 4/6/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	55	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	45	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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

Site: w004	**Rater(s):** BRH	**Date:** 4/6/20

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 *other* 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.

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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	3
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 22	**Subtotal** 33

Site: w004	Rater(s): BRH	Date: 4/6/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☑	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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

Site: w004	Rater(s): BRH	Date: 4/6/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 8

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0
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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 55

***Score can be negative**

Site: w004	Rater(s): BRH	Date: 4/6/20

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
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w004	Rater(s): BRH	Date: 4/6/20

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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w004	Rater(s): BRH	Date: 4/6/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

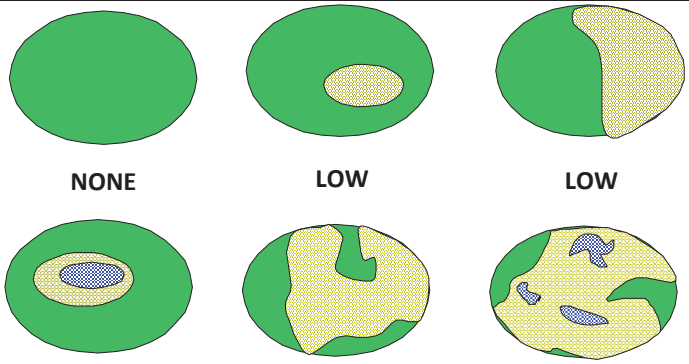
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w005	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): 0.21 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: w005	**Rater(s):** BRH	**Date:** 4/6/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
Sources/assumptions for size estimate (list):	≥ 50 acres	**6 pts**	1
	25 acres to <50 acres	**5 pts**	
	10 acres to <25 acres	**4 pts**	
Actual Wetland Size Estimate: 0.21 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. 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.**		**Score**
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	55	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	45	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 10

Site: w005	Rater(s): BRH	Date: 4/6/20

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		Score
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.)** 13	**Subtotal** 23

Site: w005	**Rater(s):** BRH	**Date:** 4/6/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☑	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☑	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	3
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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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**

- ☐ 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: 0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**

- ☐ 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: 0

5c. Low-Quality Wetland — **Score**
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: 0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 31

***Score can be negative**

Site: w005	Rater(s): BRH	Date: 4/6/20

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			
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w005	Rater(s): BRH	Date: 4/6/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

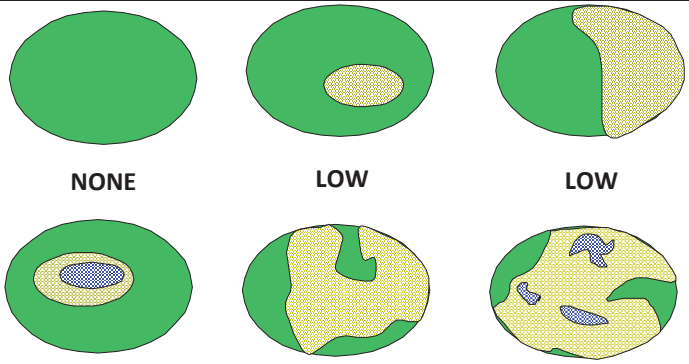
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 4

Site: w005	Rater(s): BRH	Date: 4/6/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w006	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): 0.07 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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 marsh

3. Scenic, Recreational, and Cultural Value

- Does the wetland have scenic, recreational, or cultural value? (see Narrative Discussion) ☐ Yes ☑ No

Comments:

Site: w006	**Rater(s):** BRH	**Date:** 4/6/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.07 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w006	Rater(s): BRH	Date: 4/6/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	18	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	82	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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

Site: w006	**Rater(s):** BRH	**Date:** 4/6/20

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 *other* 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.

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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	4
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 21	**Subtotal** 29

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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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	4
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☑	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	3
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.)** 10	**Subtotal** 39

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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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 8

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 47

***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			2
			Low native diversity	1 pt			
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

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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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

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.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

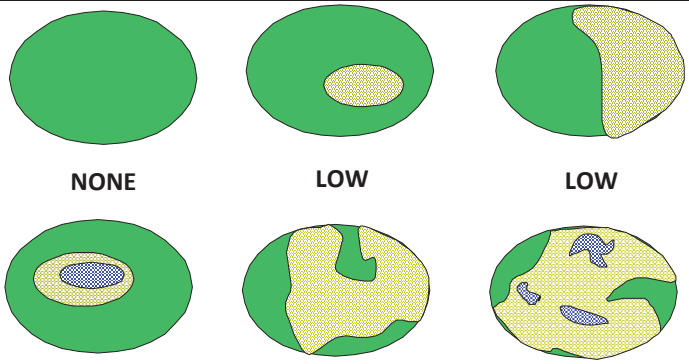
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w006	**Rater(s):** BRH	**Date:** 4/6/20

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

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	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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Ben Hess
Date of evaluation: 4/7/20	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): 1.35 acres

Wetland Type (indicate NWI & HGM classifications): PEM & Riverine

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: w007	Rater(s): BRH	Date: 4/7/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 1.35 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w007	Rater(s): BRH	Date: 4/7/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	7	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	2	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	3	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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

Site: w007	**Rater(s):** BRH	**Date:** 4/7/20

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 *other* 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.

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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	4
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**Score**
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.)** 21	**Subtotal** 26

Site: w007	**Rater(s):** BRH	**Date:** 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	4
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☑	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	7
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** 40

Site: w007	Rater(s): BRH	Date: 4/7/20

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**

- ☐ 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: 0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**

- ☐ 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: 0

5c. Low-Quality Wetland — **Score**

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: 0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 40

***Score can be negative**

Site: w007	Rater(s): BRH	Date: 4/7/20

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			
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w007	Rater(s): BRH	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w007	Rater(s): BRH	Date: 4/7/20

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)

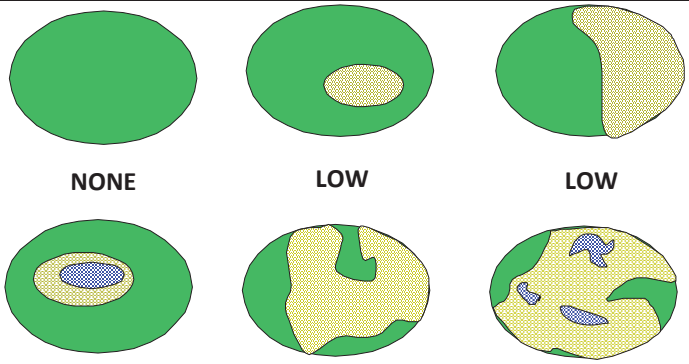
- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☑ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 2

Site: w007	Rater(s): BRH	Date: 4/7/20

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.

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	Score
				0

2. Large Woody Debris (LWD). per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)

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	Score
				0

3. Large Snags (≥12 inches DBH).

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	Score
				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)**.

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	Score
				0

6e. Microtopographic Features Score	0

Metric 6 Total: add 6a – 6e **(20 points max.)**	Total Score 7

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w008	Evaluator name: Ben Hess
Date of evaluation: 4/7/20	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): 0.07 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: w008	**Rater(s):** BRH	**Date:** 4/7/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.07 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w008	Rater(s): BRH	Date: 4/7/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	30	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ 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 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 *(minimum patch size requirement = 10 acres)*	**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

Site: w008	**Rater(s):** BRH	**Date:** 4/7/20

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 *other* 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.
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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	3
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 22	**Subtotal** 33

Site: w008	Rater(s): BRH	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☑	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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

Site: w008	Rater(s): BRH	Date: 4/7/20

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**: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**: 8

- ☐ 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]**

5c. Low-Quality Wetland — **Score**: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 55

***Score can be negative**

Site: w008	Rater(s): BRH	Date: 4/7/20

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
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w008	Rater(s): BRH	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w008	Rater(s): BRH	Date: 4/7/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

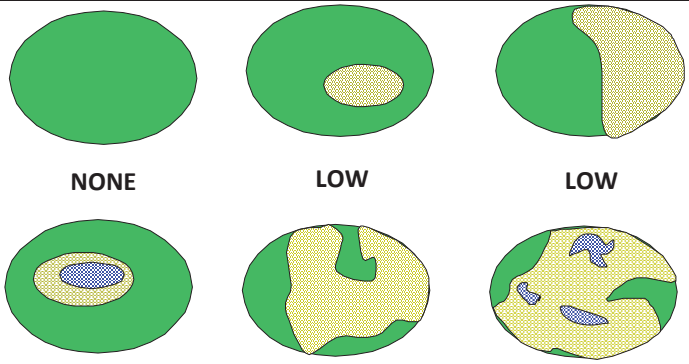
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w008	**Rater(s):** BRH	**Date:** 4/7/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w009	Evaluator name: Ben Hess
Date of evaluation: 4/7/20	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): 0.81 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: w009	**Rater(s):** BRH	**Date:** 4/7/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.81 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	31	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	1	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	68	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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.)** 7	**Sub-total:** 12

Site: w009	**Rater(s):** BRH	**Date:** 4/7/20

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 *other* 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.
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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	4
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 23	**Subtotal** 35

Site: w009	Rater(s): BRH	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	4
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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

Site: w009	Rater(s): BRH	Date: 4/7/20

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**

- ☐ 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: 0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**

- ☐ 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: 8

5c. Low-Quality Wetland — **Score**

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: 0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 61

***Score can be negative**

Site: w009	Rater(s): BRH	Date: 4/7/20

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			
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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	6

Subtotal 6

Site: w009	Rater(s): BRH	Date: 4/7/20

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)	**OR →**	**Secondary Indicators (must have 2)**
☑ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☑ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 1

Site: w009	Rater(s): BRH	Date: 4/7/20

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)

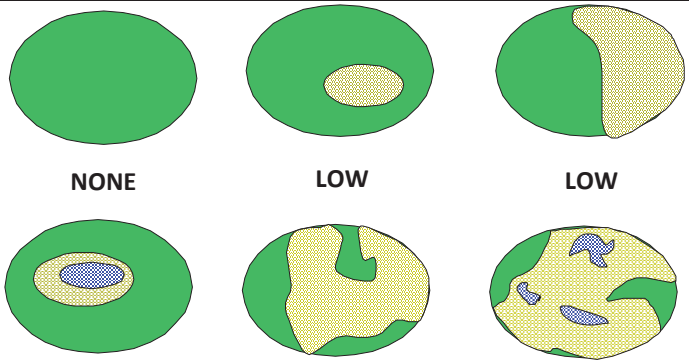
- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☑ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ Other(s): specify below

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.



		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

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w010	Evaluator name: Ben Hess
Date of evaluation: 4/7/20	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): 0.16 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: w010	**Rater(s):** BRH	**Date:** 4/7/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
Sources/assumptions for size estimate (list):	≥ 50 acres	**6 pts**	1
	25 acres to <50 acres	**5 pts**	
	10 acres to <25 acres	**4 pts**	
Actual Wetland Size Estimate: 0.16 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. 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.**		**Score**
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

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: w010	Rater(s): BRH	Date: 4/7/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	30	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ 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 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 *(minimum patch size requirement = 10 acres)*	**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:** 12

Site: w010	**Rater(s):** BRH	**Date:** 4/7/20

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 *other* 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.

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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	3
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 16	**Subtotal** 28

Site: w010	Rater(s): BRH	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☑	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**Score**
Excellent:	Wetland appears to represent the best of its type.	**7 pts**	4
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

Site: w010	Rater(s): BRH	Date: 4/7/20

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**: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**: 8

- ☐ 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]**

5c. Low-Quality Wetland — **Score**: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 52

***Score can be negative**

Site: w010	Rater(s): BRH	Date: 4/7/20

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	
		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			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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w010	Rater(s): BRH	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w010	Rater(s): BRH	Date: 4/7/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

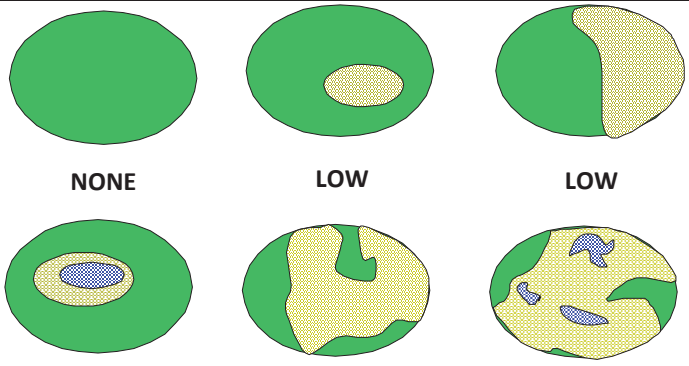
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w010	Rater(s): BRH	Date: 4/7/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w011	Evaluator name: Ben Hess
Date of evaluation: 4/7/20	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): 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.

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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.03 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	27	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	0	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	0	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ 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 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 *(minimum patch size requirement = 10 acres)*	**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

Site: w011	**Rater(s):** BRH	**Date:** 4/7/20

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 *other* 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.

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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	3
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 16	**Subtotal** 27

Site: w011	Rater(s): BRH	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☑	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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** 42

Site: w011	Rater(s): BRH	Date: 4/7/20

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**: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**: 8

- ☐ 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]**

5c. Low-Quality Wetland — **Score**: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 50

***Score can be negative**

Site: w011	Rater(s): BRH	Date: 4/7/20

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
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w011	Rater(s): BRH	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☑ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ 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

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

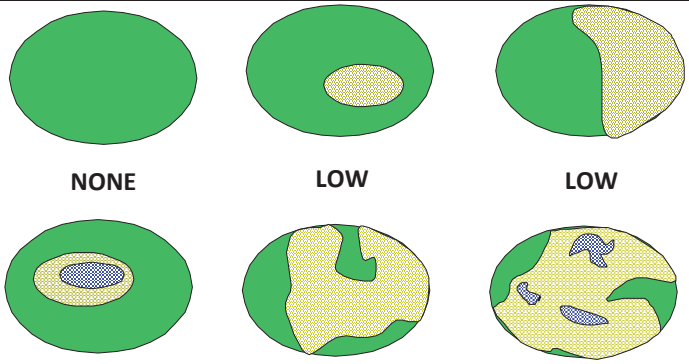
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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

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.

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	Score
				0

2. Large Woody Debris (LWD). per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)

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	Score
				0

3. Large Snags (≥12 inches DBH).

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	Score
				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)**.

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	Score
				0

6e. Microtopographic Features Score	0

Metric 6 Total: add 6a – 6e **(20 points max.)**	Total Score 4

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Crystal Renskers
Date of evaluation: 4/7/20	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees)	Email: crystal.renskers@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): 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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.03 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w101	**Rater(s):** CDAR	**Date:** 4/7/20

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	3	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road		**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	20	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	77	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 7

Site: w101	**Rater(s):** CDAR	**Date:** 4/7/20

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**Score**
No Hydrologic Alterations Apparent	**9 pts**	3
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

Site: w101	Rater(s): CDAR	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☑	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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** 30

Site: w101	Rater(s): CDAR	Date: 4/7/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 8

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 8	**Subtotal** 38

***Score can be negative**

Site: w101	Rater(s): CDAR	Date: 4/7/20

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
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w101	Rater(s): CDAR	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☑ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 0

Site: w101	Rater(s): CDAR	Date: 4/7/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

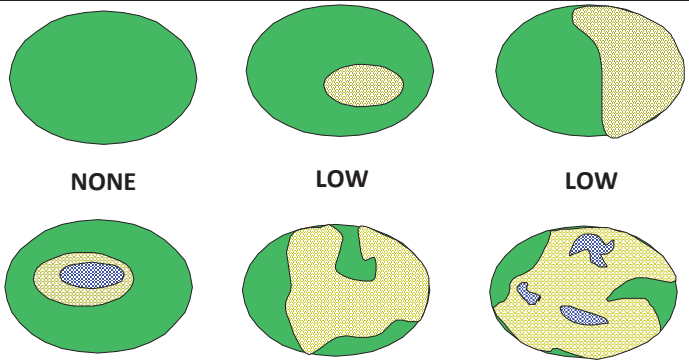
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w101	**Rater(s):** CDAR	**Date:** 4/7/20

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

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	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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Crystal Renskers
Date of evaluation: 4/7/20	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees)	Email: crystal.renskers@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): 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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.16 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	28	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	2	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake		**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ 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 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 *(minimum patch size requirement = 10 acres)*	**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

Site: w102	**Rater(s):** CDAR	**Date:** 4/7/20

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 14	**Subtotal** 23

Site: w102	Rater(s): CDAR	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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

Site: w102	Rater(s): CDAR	Date: 4/7/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 38

***Score can be negative**

Site: w102	Rater(s): CDAR	Date: 4/7/20

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
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w102	Rater(s): CDAR	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☑ Algal mat or crust (B4)		☐ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ 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

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

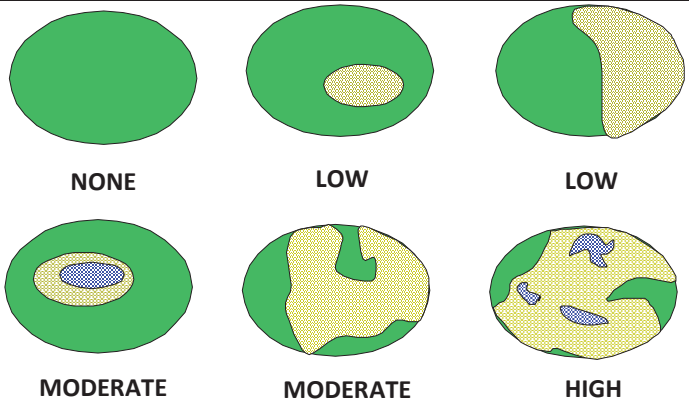
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w102	**Rater(s):** CDAR	**Date:** 4/7/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Crystal Renskers
Date of evaluation: 4/7/20	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees)	Email: crystal.renskers@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): 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.

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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.03 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ gravel or double-track dirt roads (includes ATV trails)	**Score**

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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	36	**4 pts**	2
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road		**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	21	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	43	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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

Site: w103	**Rater(s):** CDAR	**Date:** 4/7/20

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 *other* 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.
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.

			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	3
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 14	**Subtotal** 25

Site: w103	Rater(s): CDAR	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	4
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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

Site: w103	Rater(s): CDAR	Date: 4/7/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 43

***Score can be negative**

Site: w103	Rater(s): CDAR	Date: 4/7/20

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	
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 44

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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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 44

Site: w103	Rater(s): CDAR	Date: 4/7/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

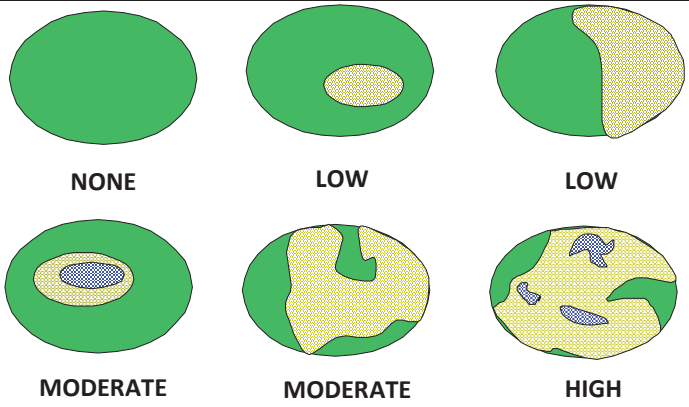
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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: w103	**Rater(s):** CDAR	**Date:** 4/7/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w104	Evaluator name: Crystal Renskers
Date of evaluation: 4/8/20	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees)	Email: crystal.renskers@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): 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: w104	**Rater(s):** CDAR	**Date:** 4/8/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.21 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river		**4 pts**	1
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road		**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	37	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	63	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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.)** 3	**Sub-total:** 7

Site: w104	**Rater(s):** CDAR	**Date:** 4/8/20

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 *other* 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.
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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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

Site: w104	**Rater(s):** CDAR	**Date:** 4/8/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☑	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☑	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	3
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**	1
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

Site: w104	Rater(s): CDAR	Date: 4/8/20

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**: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**: 0

- ☐ 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]**

5c. Low-Quality Wetland — **Score**: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 25

***Score can be negative**

Site: w104	Rater(s): CDAR	Date: 4/8/20

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			
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 27

Site: w104	Rater(s): CDAR	Date: 4/8/20

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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 27

Site: w104	Rater(s): CDAR	Date: 4/8/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

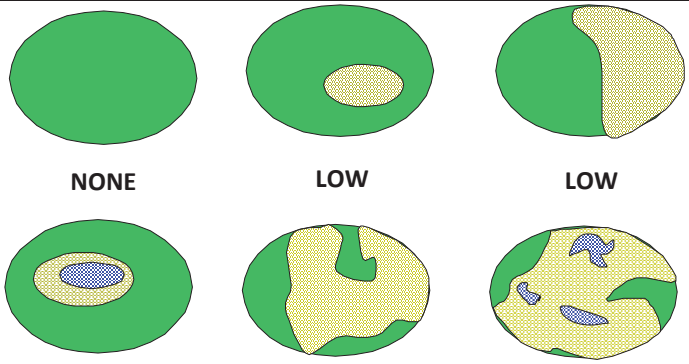
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Crystal Renskers
Date of evaluation: 4/8/20	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees)	Email: crystal.renskers@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): 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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.05 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river		**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road		**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	10	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	90	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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

Site: w105	**Rater(s):** CDAR	**Date:** 4/8/20

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 18

Site: w105	**Rater(s):** CDAR	**Date:** 4/8/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☑	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	7
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

Site: w105	Rater(s): CDAR	Date: 4/8/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 31

***Score can be negative**

Site: w105	**Rater(s):** CDAR	**Date:** 4/8/20

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
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☑ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 31

Site: w105	Rater(s): CDAR	Date: 4/8/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

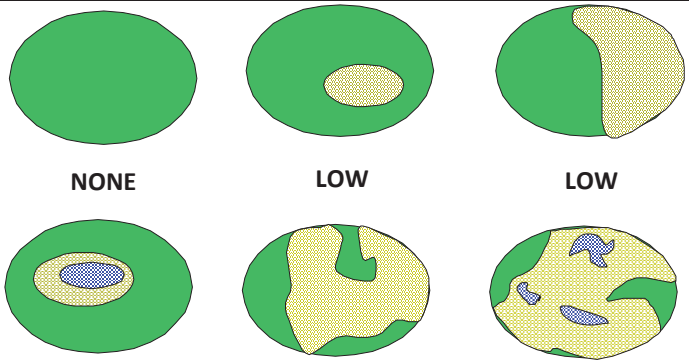
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Kaitlin Hillier
Date of evaluation: 4/7/20	Phone number: 513-233-7041
Lat/Long coordinates: (decimal degrees)	Email: kaitlin.hillier@cardno.com
County: Caldwell	Evaluator affiliation and address: Cardno, 11121 canal road, cincinnati, OH 45241
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): 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

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.03 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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

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
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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	Land Use Types:		Estimate % of each category **here** ↓		Score
Very Low:	☒ mature growth forest	☐ other wetland, lake, stream, river		**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake		**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	80	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**2 pts** (circled)	
Up to 1000 ft.	>25% of area is patch	**2 pts**	
	<25% of area is patch	**0 pts** (circled)	

Metric 2 Total: add 2a – 2c **(12 points max.)** 4	**Sub-total:** 6

Site: w201	Rater(s): KGH	Date: 4/7/20

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 *other* 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. 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.		Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season) **4 pts**	3
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).

Low	High	Alteration	Low	High	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.		Score
No Hydrologic Alterations Apparent Wetland receives water from a tile;	**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.)** 16	**Subtotal** 22

Site: w201	Rater(s): KGH	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	4
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	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.			**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

Site: w201	Rater(s): KGH	Date: 4/7/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 36

***Score can be negative**

Site: w201	Rater(s): KGH	Date: 4/7/20

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		
		Invasive or non-native species dominate the coverage		0 pts			
	<25% of wetland area			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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

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)**
☐ Surface Water present on aerial imagery (A1)		☑ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 36

Site: w201	Rater(s): KGH	Date: 4/7/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

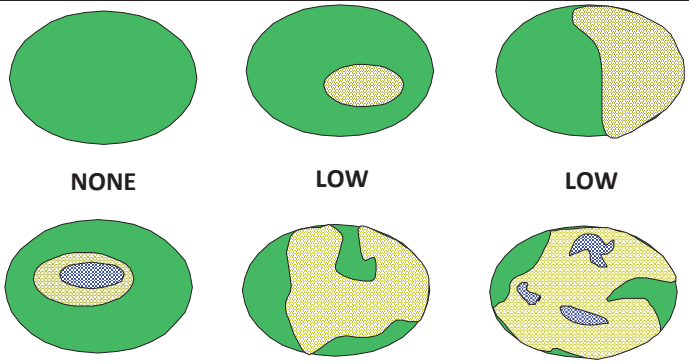
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 37

Site: w201	**Rater(s):** KGH	**Date:** 4/7/20

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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	Evaluator name: Kaitlin Hillier
Date of evaluation: 4/7/20	Phone number: 513-233-7041
Lat/Long coordinates: (decimal degrees)	Email: kaitlin.hillier@cardno.com
County: Caldwell	Evaluator affiliation and address: Cardno, 11121 canal road, cincinnati, OH 45241
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): 0.64 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w202	**Rater(s):** KGH	**Date:** 4/7/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
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**	
Actual Wetland Size Estimate: 0.64 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. 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.**		**Score**
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

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

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
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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	Land Use Types:		Estimate % of each category here ↓		Score
Very Low:	☒ mature growth forest	☐ other wetland, lake, stream, river	20	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☒ old field ☐ single track and two track dirt roads ☐ one-lane paved road	15	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☒ two-lane road ☐ railroad ☐ man-made lake	5	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	60	**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**	2
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**2 pts** (circled)	
Up to 1000 ft.	>25% of area is patch	**2 pts**	
	<25% of area is patch	**0 pts** (circled)	

Metric 2 Total: add 2a – 2c **(12 points max.)** 4	**Sub-total:** 6

Site: w202	Rater(s): KGH	Date: 4/7/20

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 *other* 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. 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.			Score
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).

Low	High	Alteration	Low	High	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.		Score
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

Site: w202	**Rater(s):** KGH	**Date:** 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☑	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	7
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** 32

Site: w202	Rater(s): KGH	Date: 4/7/20

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**

- ☐ 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: 0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**

- ☐ 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: 0

5c. Low-Quality Wetland — **Score**
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: 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

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			
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 34

Site: w202	Rater(s): KGH	Date: 4/7/20

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☑ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ 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

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

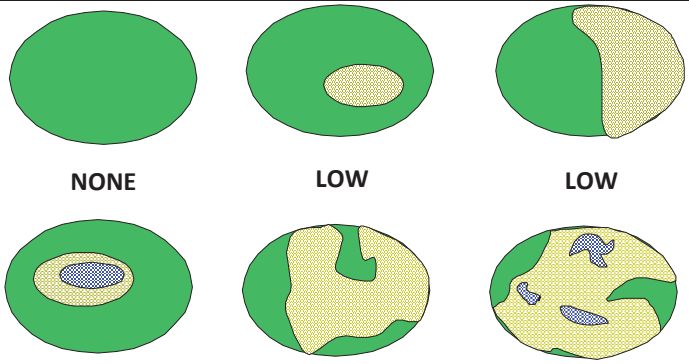
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 35

Site: w202	Rater(s): KGH	Date: 4/7/20

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.

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	**Score**
				3

2. Large Woody Debris (LWD). per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)

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	**Score**
				0

3. Large Snags (≥12 inches DBH).

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	**Score**
				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)**.

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	**Score**
				0

6e. Microtopographic Features Score	3

Metric 6 Total: add 6a – 6e **(20 points max.)**	**Total Score** 6

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w203	Evaluator name: Kaitlin Hillier
Date of evaluation: 4/7/20	Phone number: 513-233-7041
Lat/Long coordinates: (decimal degrees)	Email: kaitlin.hillier@cardno.com
County: Caldwell	Evaluator affiliation and address: Cardno, 11121 canal road, cincinnati, OH 45241
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): 0.62 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w203	**Rater(s):** KGH	**Date:** 4/7/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
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**	
Actual Wetland Size Estimate: 0.62 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. 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.**		**Score**
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

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

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
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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	Land Use Types:		Estimate % of each category here ↓		Score
Very Low:	☒ mature growth forest	☐ other wetland, lake, stream, river	15	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☒ old field ☐ single track and two track dirt roads ☐ one-lane paved road	10	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☒ two-lane road ☐ railroad ☐ man-made lake	5	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ 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 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 *(minimum patch size requirement = 10 acres)*	**2 pts** (circled)	
Up to 1000 ft.	>25% of area is patch	**2 pts**	
	<25% of area is patch	**0 pts** (circled)	

Metric 2 Total: add 2a – 2c **(12 points max.)** 5	**Sub-total:** 9

Site: w203	Rater(s): KGH	Date: 4/7/20

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 *other* 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. 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.			Score
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).

Low	High	Alteration	Low	High	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.		Score
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

Site: w203	Rater(s): KGH	Date: 4/7/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☑	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☑	☐	Herbicide or chemical treatment	☐	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	7
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** 32

Site: w203	Rater(s): KGH	Date: 4/7/20

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**

- ☐ 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: 0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — **Score**

- ☐ 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: 0

5c. Low-Quality Wetland — **Score**
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: 0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 32

***Score can be negative**

Site: w203	Rater(s): KGH	Date: 4/7/20

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	
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

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)**
☑ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 35

Site: w203	Rater(s): KGH	Date: 4/7/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

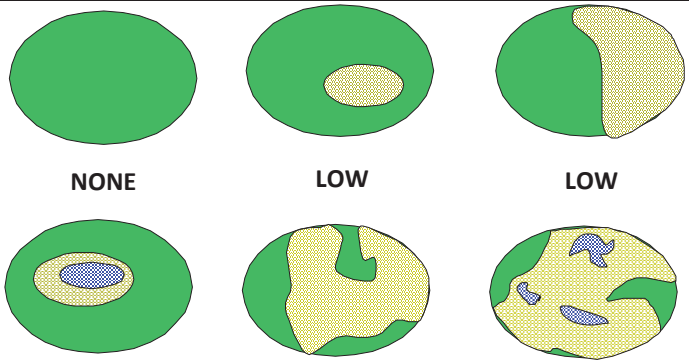
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☑ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☑ *Typha ssp.* (Cattail species)*
- ☐ Other(s): specify below

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.



		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 35

Site: w203	Rater(s): KGH	Date: 4/7/20

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.

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	**Score** 2

2. Large Woody Debris (LWD). per log, average width ≥6 inches (e.g., fallen trees and/or large branches, etc.)

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	**Score** 0

3. Large Snags (≥12 inches DBH).

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	**Score** 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)**.

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	**Score** 0

6e. Microtopographic Features Score	2

Metric 6 Total: add 6a – 6e **(20 points max.)**	**Total Score** 5

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w204	Evaluator name: Kaitlin Hillier
Date of evaluation: 4/8/20	Phone number: 513-233-7041
Lat/Long coordinates: (decimal degrees)	Email: kaitlin.hillier@cardno.com
County: Caldwell	Evaluator affiliation and address: Cardno, 11121 canal road, cincinnati, OH 45241
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): 0.62 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w204	**Rater(s):** KGH	**Date:** 4/8/20

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points. Using GIS, estimate the size of the wetland (i.e., Wetland Assessment Area). **Select one size class.**			**Score**
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**	
Actual Wetland Size Estimate: 0.73 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. 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.**		**Score**
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

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

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:	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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	Land Use Types:		Estimate % of each category **here** ↓		Score
Very Low:	☒ mature growth forest	☐ other wetland, lake, stream, river	15	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road		**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	20	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	65	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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

Site: w204	Rater(s): KGH	Date: 4/8/20

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 *other* 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. 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.			Score
Semi- to Permanently Inundated/ Saturated	(75 – 100% of growing season)	**4 pts**	4
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).

Low	High	Alteration	Low	High	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.		Score
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.)** 13	**Subtotal** 18

Site: w204	Rater(s): KGH	Date: 4/8/20

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☐	plowing, disking
☑	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	3
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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☑	☐	plowing/disking/farming
☐	☐	mowing or shrub removal	☑	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	7
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

Site: w204	Rater(s): KGH	Date: 4/8/20

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 31

***Score can be negative**

Site: w204	Rater(s): KGH	Date: 4/8/20

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	
		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** 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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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

Site: w204	Rater(s): KGH	Date: 4/8/20

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)	**OR →**	**Secondary Indicators (must have 2)**
☑ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☐ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

Subtotal 36

Site: w204	Rater(s): KGH	Date: 4/8/20

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

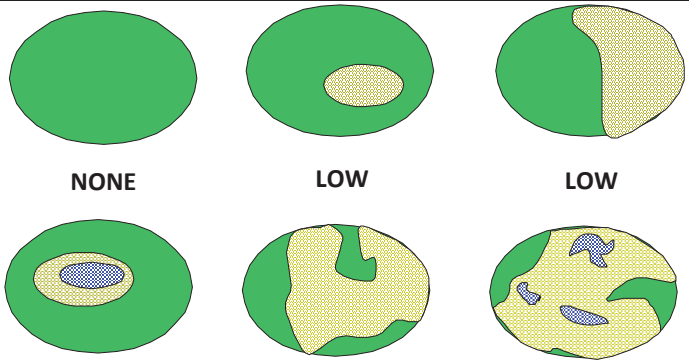
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☑ *Typha ssp.* (Cattail species)*
- ☐ Other(s): specify below

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.



		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

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

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	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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☒ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

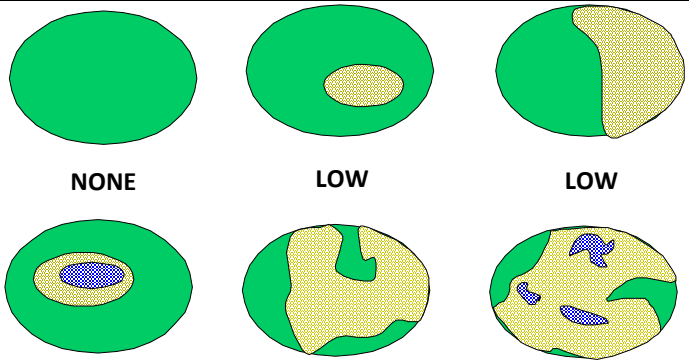
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

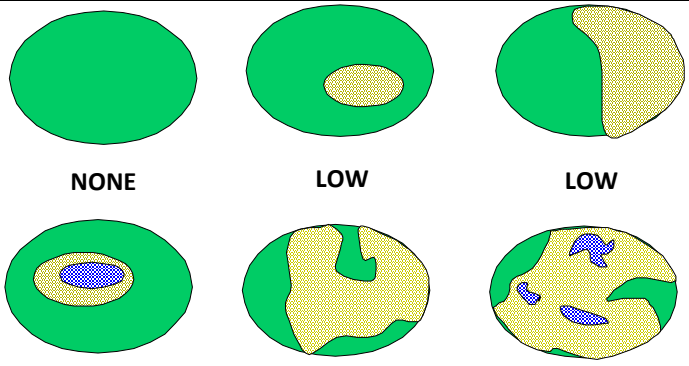
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

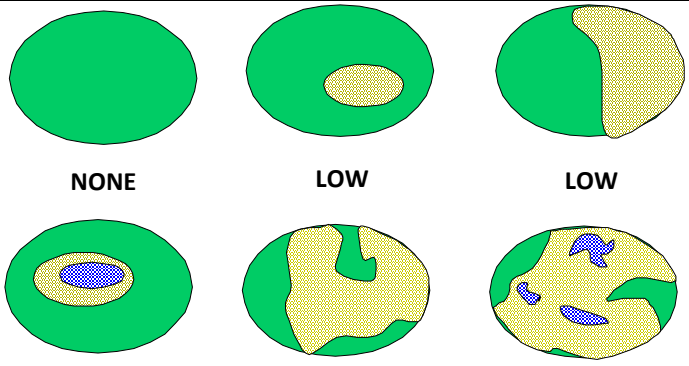
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

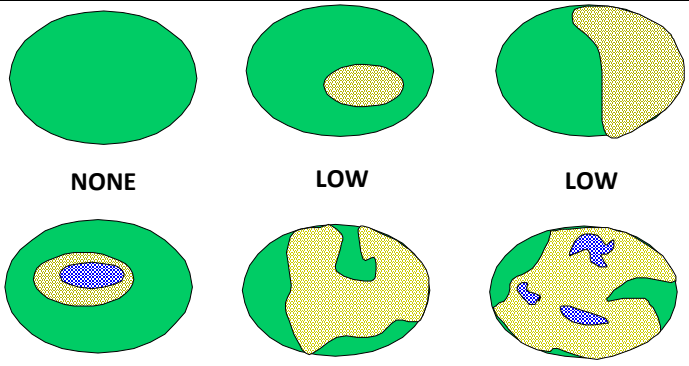
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

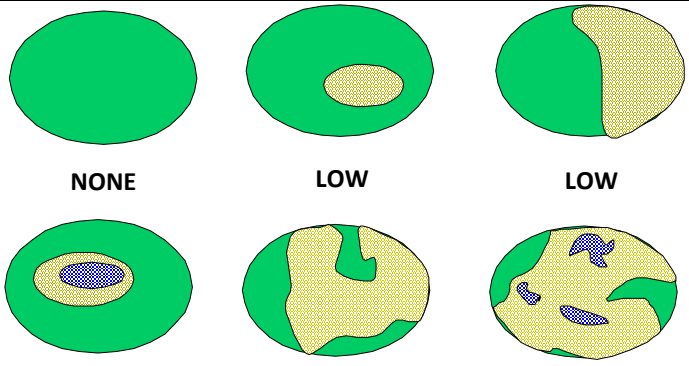
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

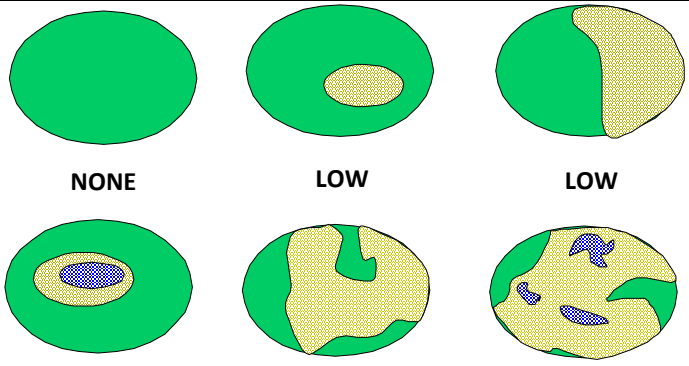
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

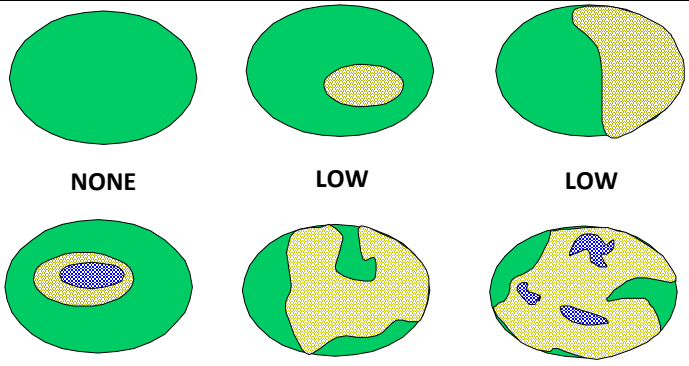
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

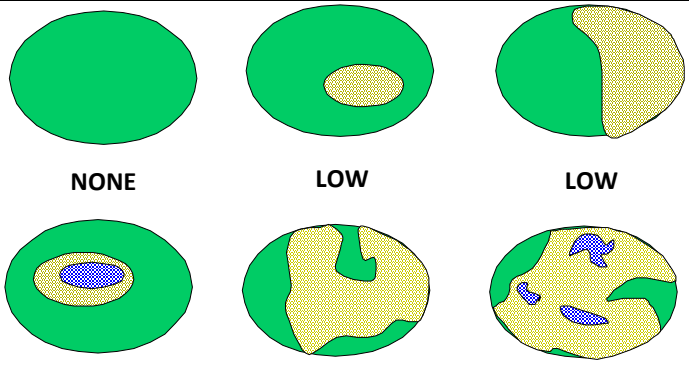
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

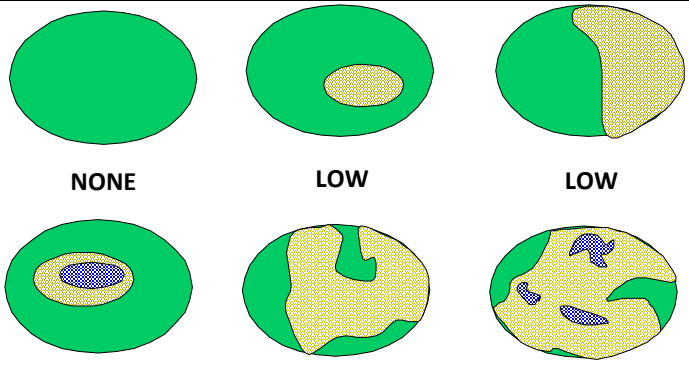
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

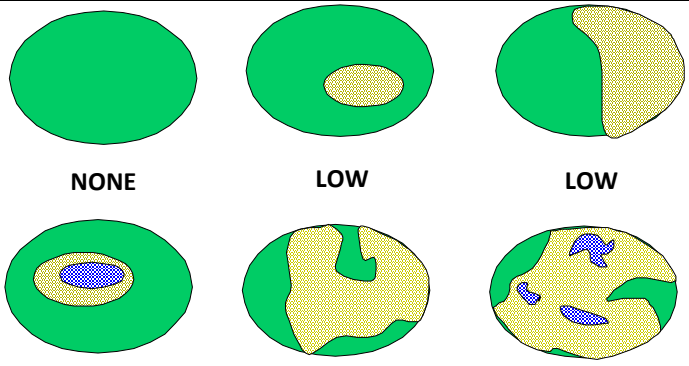
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☒ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

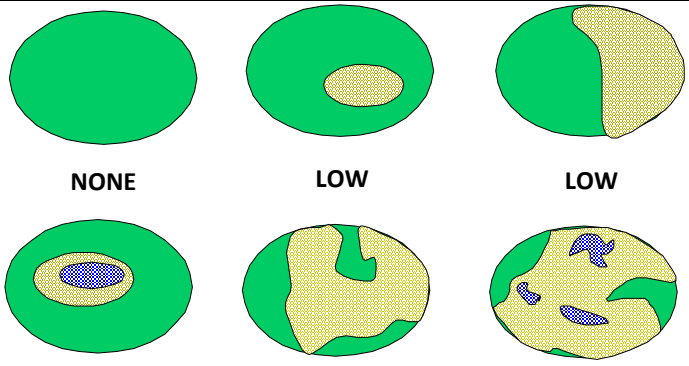
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

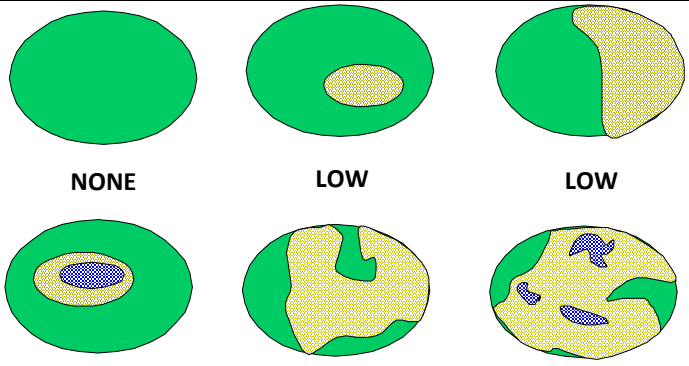
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☒ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☒ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

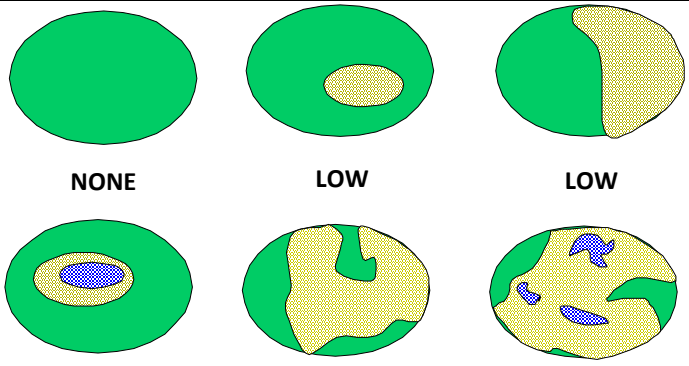
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

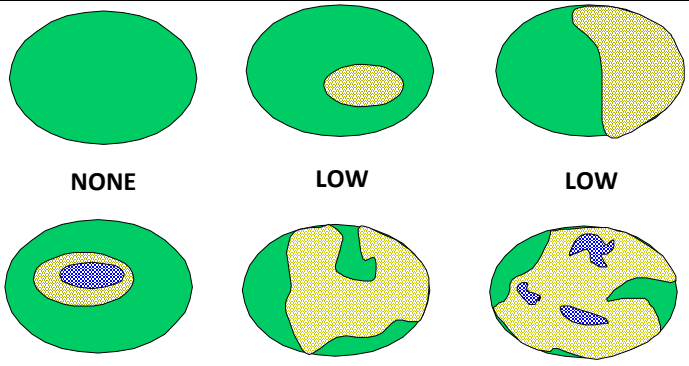
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

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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. 0

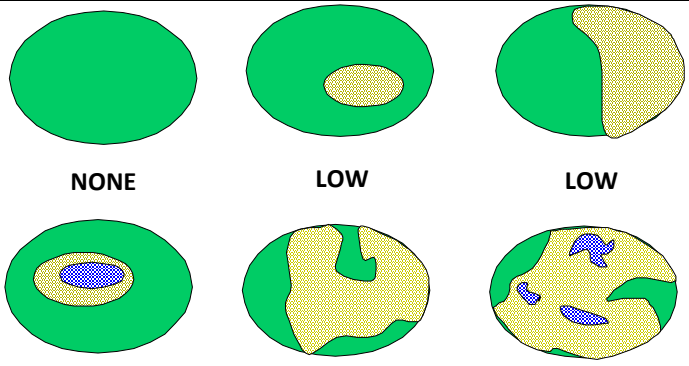
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

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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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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: 0

- ☐ 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.

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities) — Score: 0

- ☐ 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]**

5c. Low-Quality Wetland — Score: 0

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]**

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

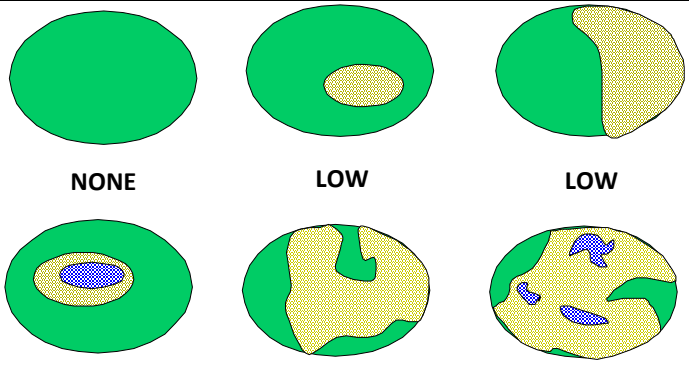
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake X mowed hay field	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** (circled)	
Wetland Complex. The wetland is part of a large scale (10+ acres) complex of *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

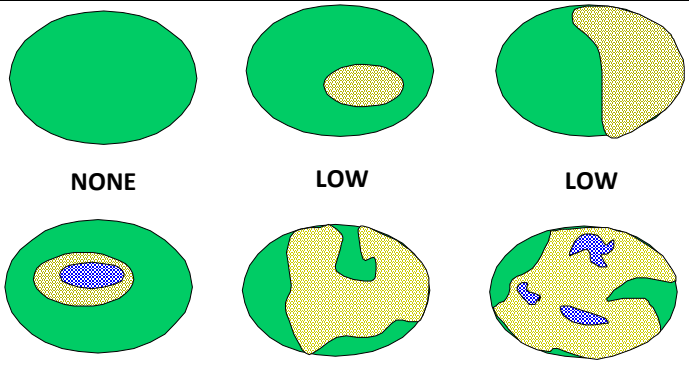
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake x Mowed Hay field	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

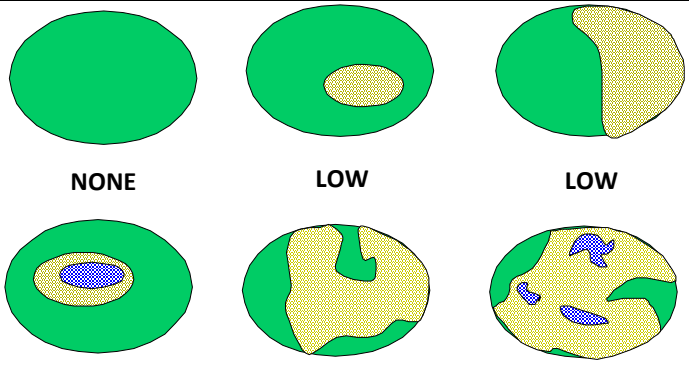
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake x mowed hay field	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

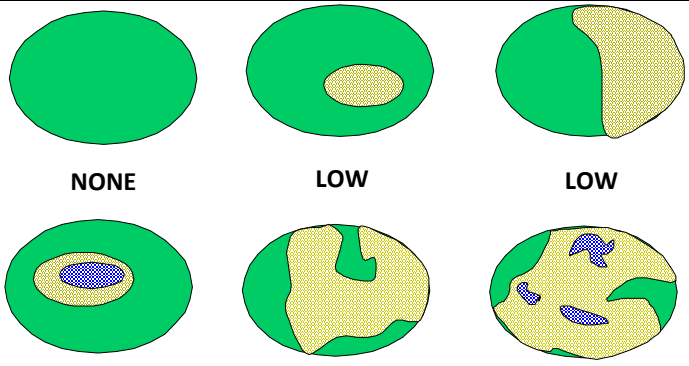
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

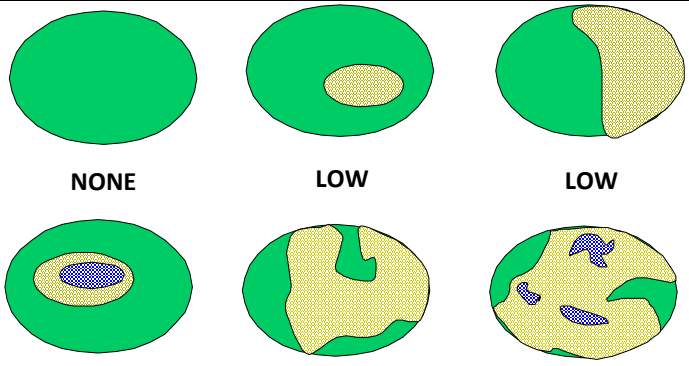
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

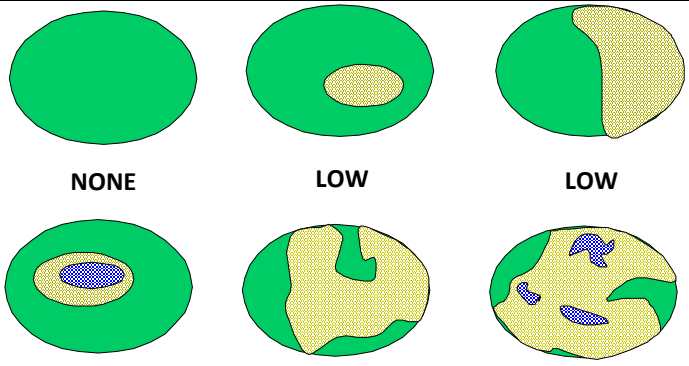
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

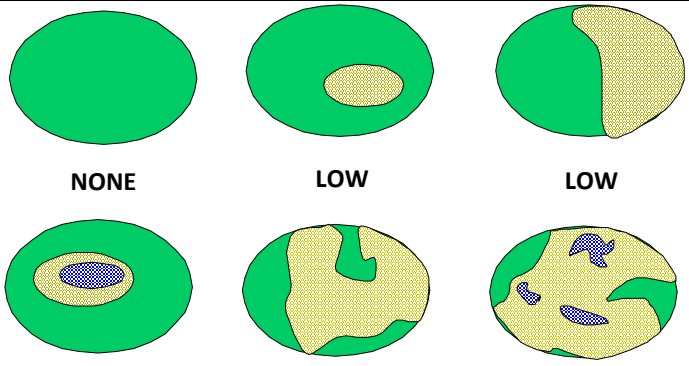
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☒ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☒ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

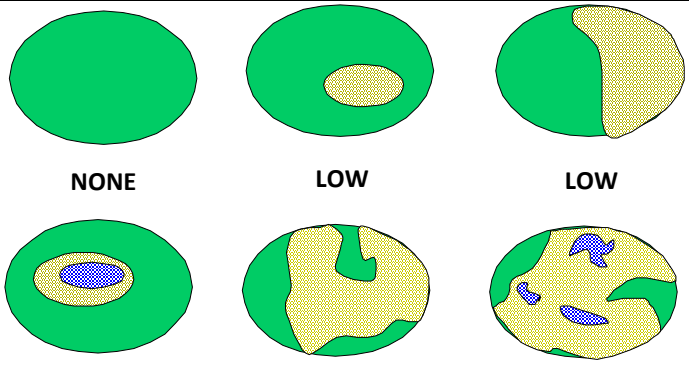
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake x new field	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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. 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.			**Score**
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

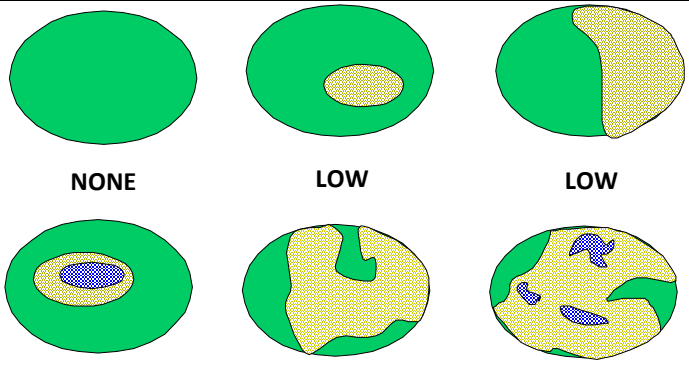
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake x new field	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

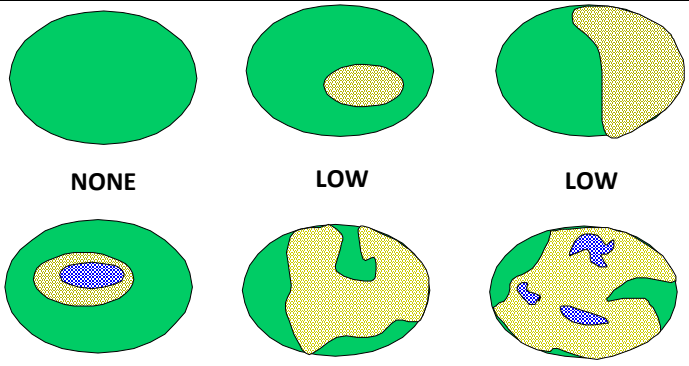
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

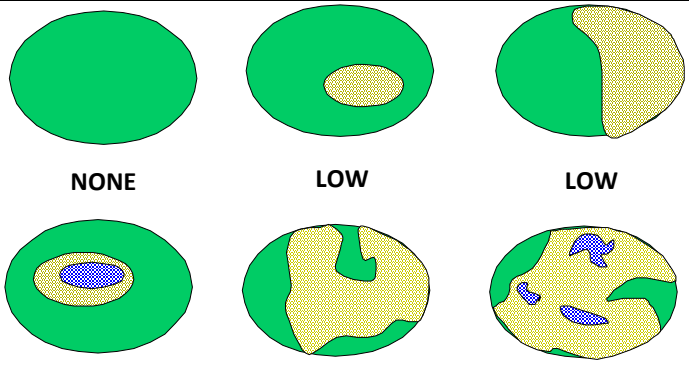
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

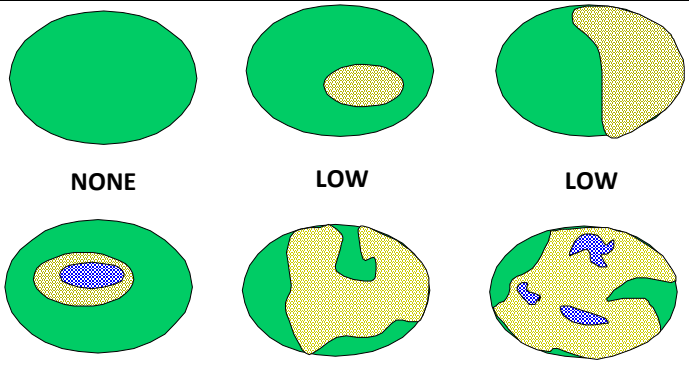
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

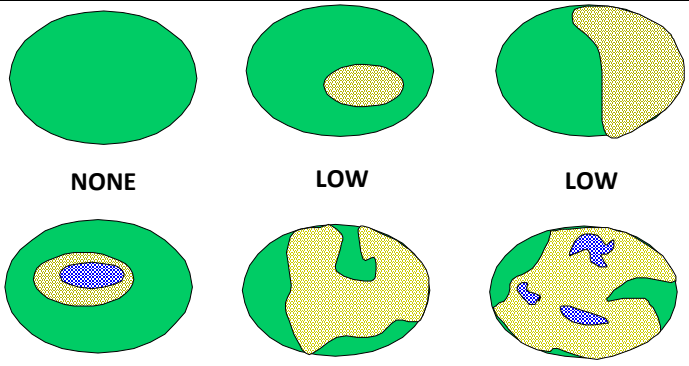
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

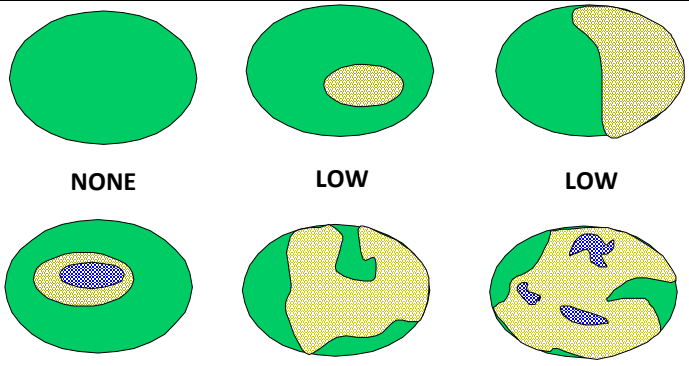
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

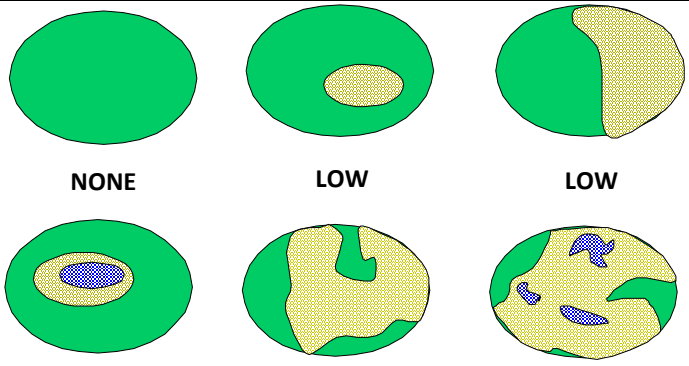
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

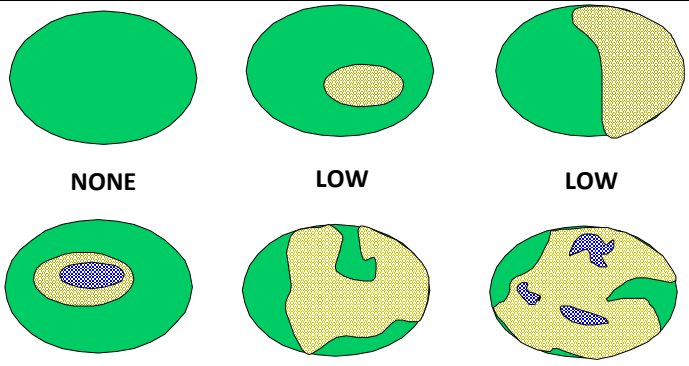
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	Evaluator name: Ben Hess
Date of evaluation: 5/24/21	Phone number: 317-388-1982
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

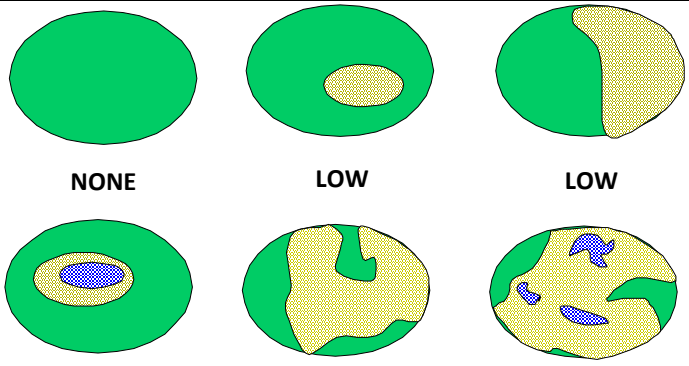
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

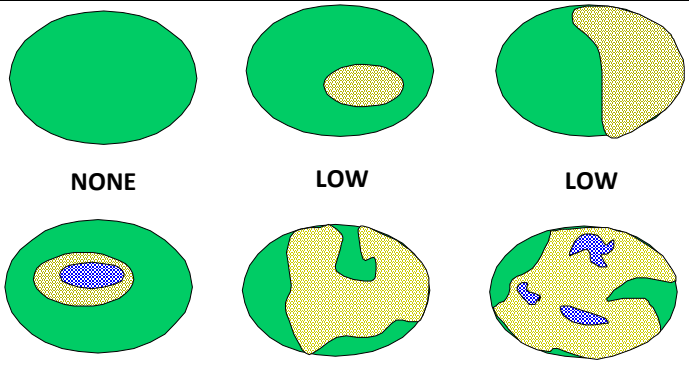
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

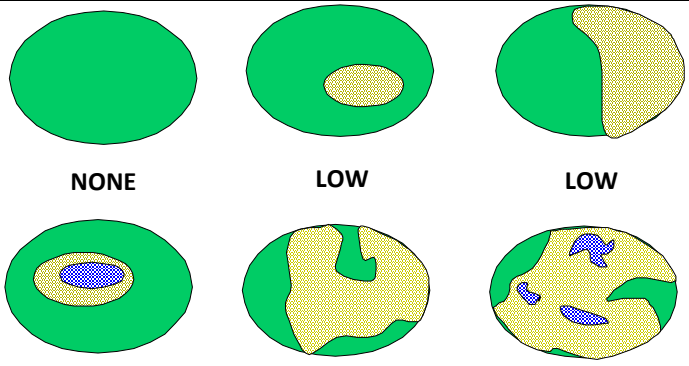
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

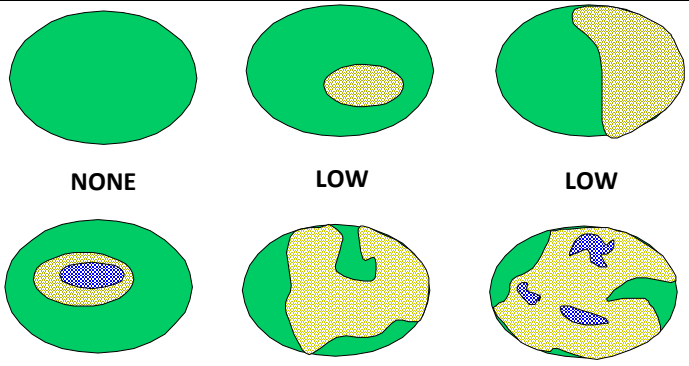
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

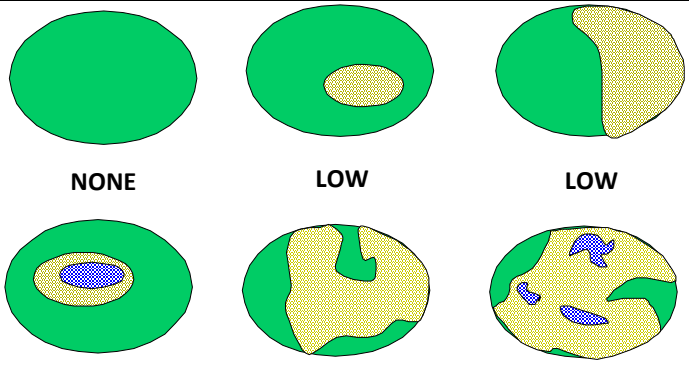
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

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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. 0

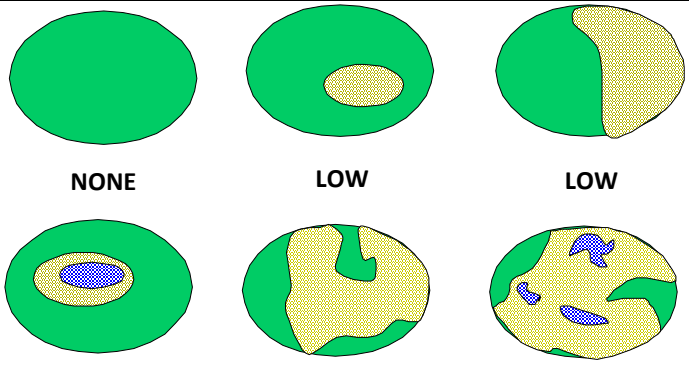
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

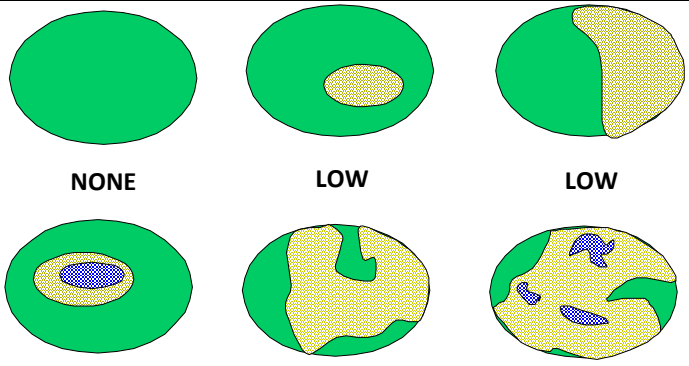
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☒ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

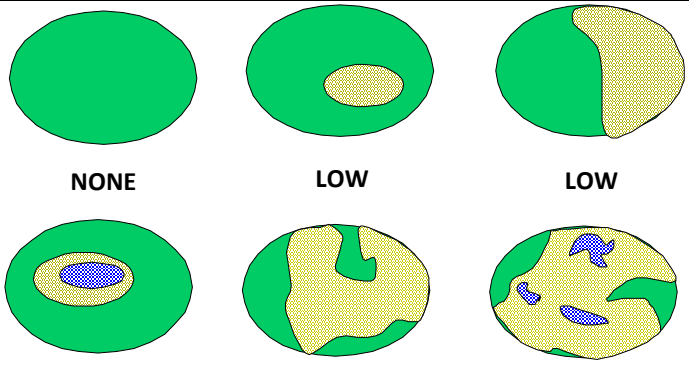
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** (circled)	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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

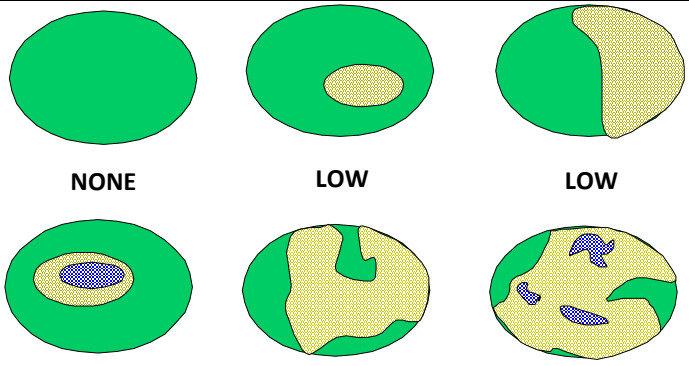
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☐ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

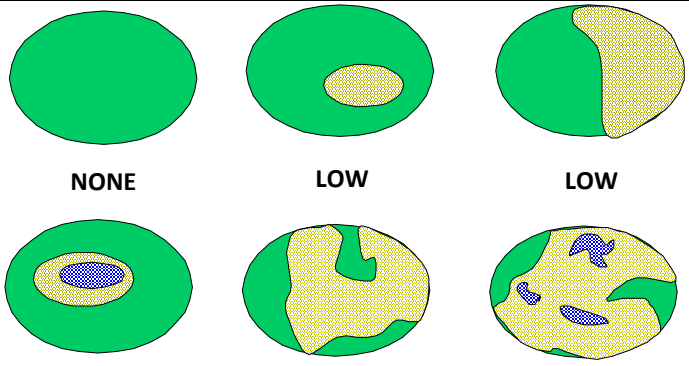
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

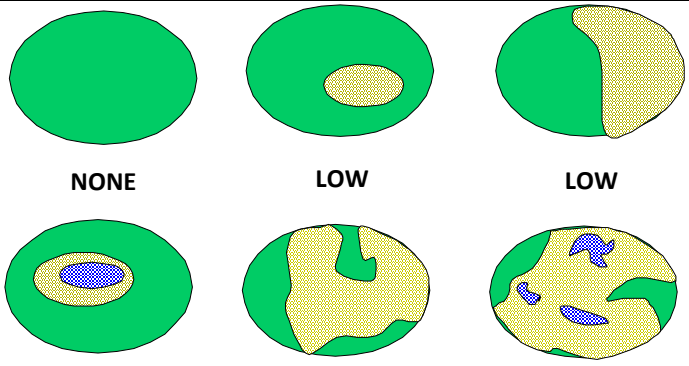
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☐ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

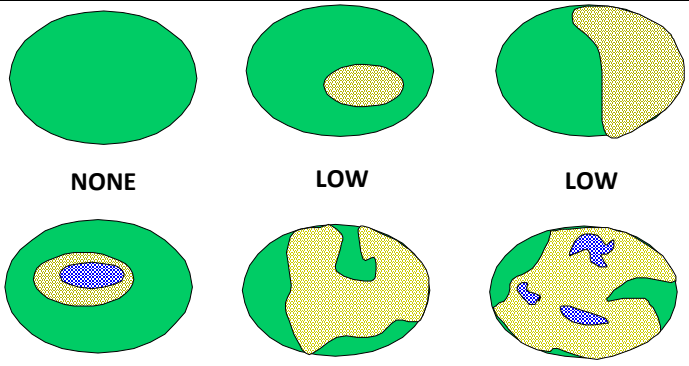
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

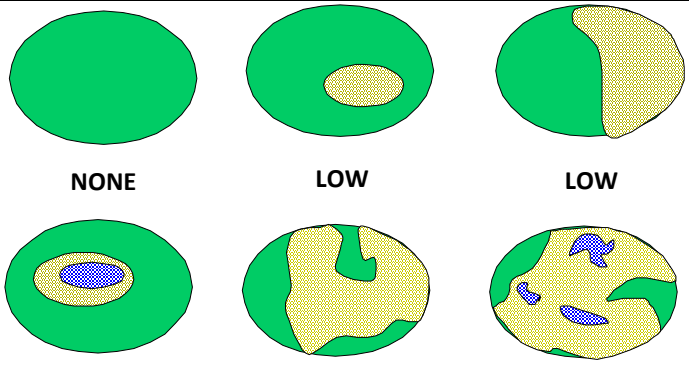
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

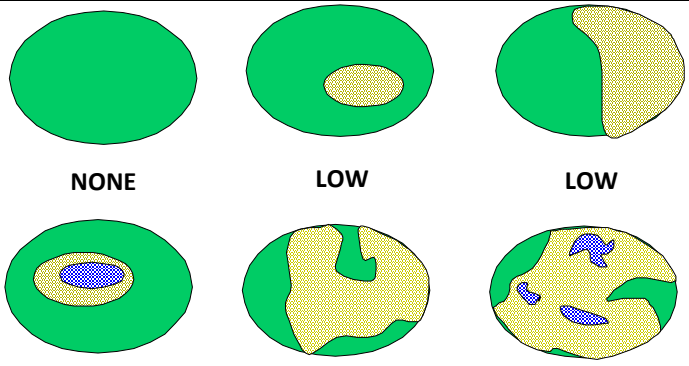
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

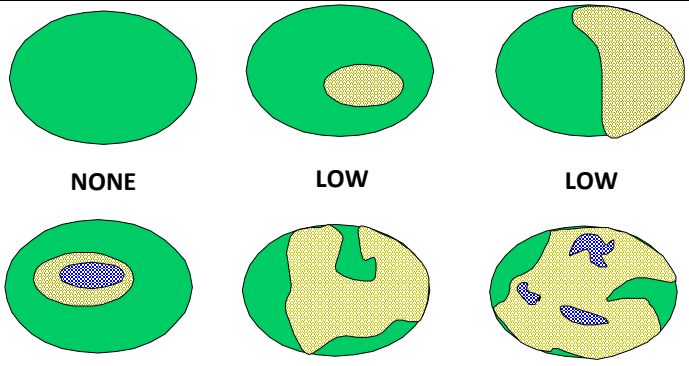
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

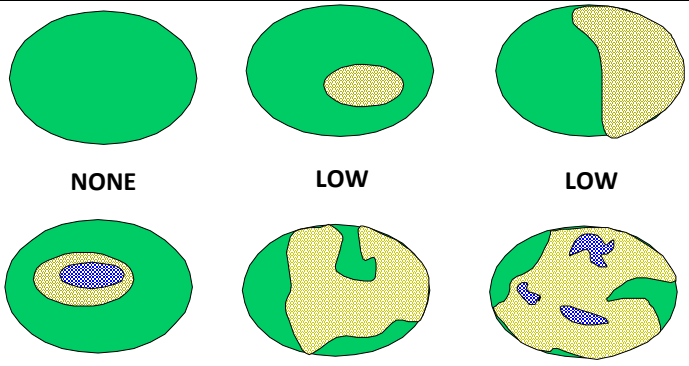
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☒ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

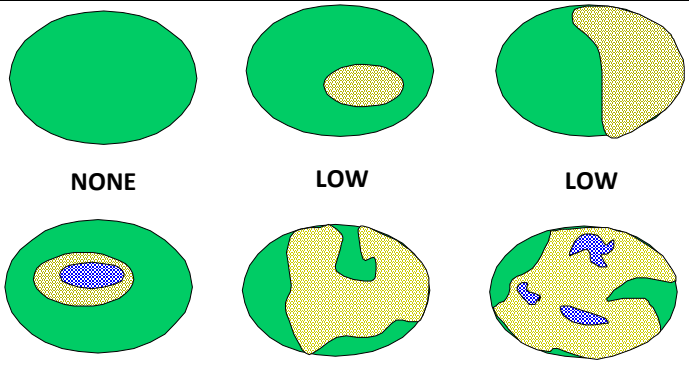
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity ☐ 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 in 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 comprised by each of the four categories 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:	☒ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☐ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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 *other* 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.

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.

			Score
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).

Low	**High**	**Alteration**	**Low**	**High**	**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.		**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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

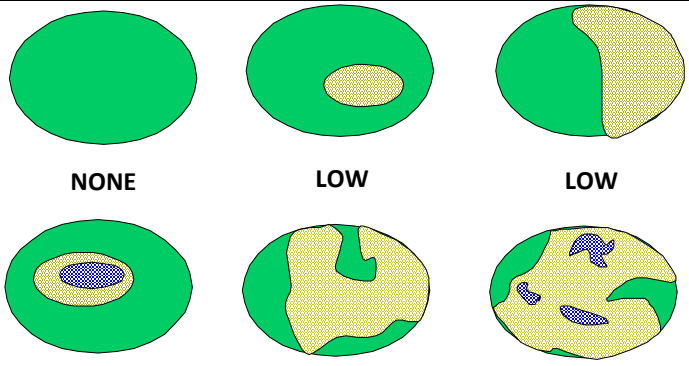
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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	# Kentucky Wetland Rapid Assessment Method (KY-WRAM) Kentucky Division of Water

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: w1001	
Date of evaluation: 5/24/21	
Lat/Long coordinates: (decimal degrees) 37.156158, -87.976589	
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	

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): 0.06 acres

Wetland Type (indicate NWI & HGM classifications): PEM & 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: w1001	**Rater(s):** BRH	**Date:** 5/24/21

Metric 1. Wetland Size and Distribution – Maximum 9 points.

1a. Wetland Size – Maximum 6 points.
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: 0.06 acres

Wetland area proposed to be impacted: _____ %

		Score
≥ 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.
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.**

		Score
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

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: w1001	Rater(s): BRH	Date: 5/24/21

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:**	
☐ shrubland, forest of any age, natural grassland, natural rock outcrops and cobble bars	☐ lawns, golf courses, manicured parkland	
☐ abandoned row crop field (vegetated & naturalizing)	☐ residential, commercial, industrial	
☐ hay field (non-row crop)	☐ roadways (including shoulders), parking lots	
☐ lightly managed forest (selectively logged)	☐ railroad tracks/beds	
☐ lightly managed parkland	☒ active agriculture: row crop field	
☐ other wetland, lake, or river	☐ conservation tillage, grazed pasture, utility right-of ways	
☐ Single-track dirt roads (non-motorized vehicle trails that are not sources of sediment)	☐ clear-cutting or heavily managed forest, mining, construction activity	
	☐ 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 in 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 comprised by each of the four categories 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:	☐ mature growth forest	☐ other wetland, lake, stream, river	0	**4 pts**	0
Low:	☒ shrubland/young forest ☐ hay field (non-row crop) ☐ lightly managed parkland	☐ old field ☐ single track and two track dirt roads ☐ one-lane paved road	20	**2 pts**	
Moderately High:	☐ residential & lawns ☐ manicured parkland ☐ golf course ☐ grazed pasture ☐ utility right-of-way	☐ conservation tillage ☐ recent logging and clear-cut (<5 years) ☐ two-lane road ☐ railroad ☐ man-made lake	25	**1 pts**	
High:	☐ commercial, industrial ☐ high-density residential ☐ heavily grazed pasture ☒ row crop field	☐ multi-lane paved roadway ☐ construction activity ☐ parking lot ☐ hazardous areas (mining, landfills, brownfields, etc.)	55	**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**	0
	<50% of area is patch *(minimum patch size requirement = 10 acres)*	**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:** 3

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 *other* 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.

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.

			Score
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).

Low	High	Alteration	Low	High	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.		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.)** 13	**Subtotal** 16

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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
☐	☐	filling	☐	☐	human-induced erosion or exposure	☐	☑	plowing, disking
☐	☐	grading	☐	☐	human-induced sedimentation or burial	☐	☐	intensive grazing (hooves)
☐	☐	logging	☐	☐	dredging (includes excavating)	☐	☐	off-road vehicle use
☐	☐	construction	☐	☐	vehicle use	☐	☐	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**	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
☐	☐	barriers (e.g. road bed(s)/RR grades(s))	☐	☐	large woody debris (LWD) removal	☐	☐	sedimentation
☐	☐	tree plantation	☐	☐	grazing	☐	☐	dredging
☐	☐	selective cutting	☐	☐	rutting	☐	☐	filling/grading
☐	☐	clearcutting	☐	☐	Herbicide or chemical treatment	☐	☑	plowing/disking/farming
☐	☐	mowing or shrub removal	☐	☐	nutrient enrichment, e.g., nuisance algae	☐	☐	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**	1
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**	1
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.)** 4	**Subtotal** 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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**
☐ 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.	0

5b. High Ecological Value / Ranked Communities (See manual and key for ranked list of communities)	**Score**
☐ 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]**	0

5c. Low-Quality Wetland **Check all that apply, but maximum score is -10 points:**	**Score**
☐ 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]**	0

Metric 5 Total: add 5a – 5c **(10 points max.)*** 0	**Subtotal** 20

***Score can be negative**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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			
		Invasive or non-native species dominate the coverage		0 pts			0
	<25% of wetland area			0 pts	0	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 (*Nuphar advena*) and American lotus (*Nelumbo lutea*). All floating-leaf species (including *Nymphaea* 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 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

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)**
☐ Surface Water present on aerial imagery (A1)		☐ Sparsely vegetated concave surface (B8)
☐ Water marks (B1)		☑ Drainage patterns (B10)
☐ Inundation Visible of Aerial Imagery (B7)		☐ Moss trim lines (B16)
☐ Algal mat or crust (B4)		☑ Geomorphic position (D2)
☐ Presence of aquatic fauna (B13)		
☐ Presence of true aquatic plants (B14)		

Describe here how indicators were used to determine score:

soil surface cracks

Subtotal 20

Site: w1001	Rater(s): BRH	Date: 5/24/21

6c. Coverage of Highly-Invasive Plant Species – Maximum 1 point.
Estimate the combined total coverage of **any** invasive species present in the wetland. 0

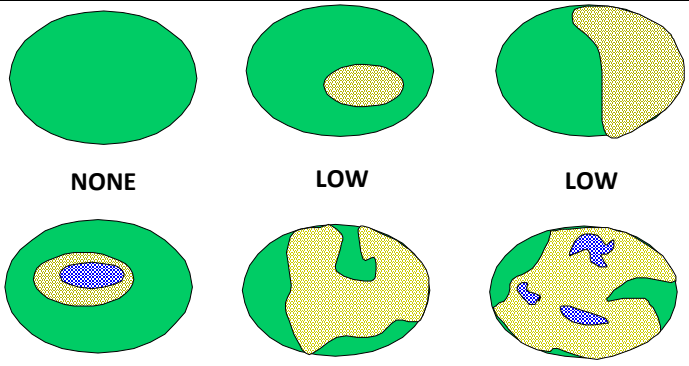
Selected invasive plant species. Remember to include any species found on the KY-EPPC list that is within the assessment area.
(Print the complete KY-EPPC list and take into the field)
*These native invasive plants are being included for the purposes of the KY-WRAM (i.e., everything on the KY-EPPC list are exotics)

- ☐ *Alliaria petiolata* (Garlic Mustard)
- ☐ *Alternanthera philoxeroides* (Alligator Weed)
- ☐ *Conium maculatum* (Poison Hemlock)
- ☐ *Euonymus fortunei* (Winter Creeper)
- ☐ *Lespedeza cuneata, L. bicolor, L. stipulacea, L. striata, L. thunbergii* (non-native *Lespedeza*)
- ☐ *Ligustrum sinense, L. vulgare* (Privet)
- ☐ *Lonicera japonica* (Japanese Honeysuckle)
- ☐ *Lonicera maackii* (Bush Honeysuckle)
- ☐ *Lythrum salicaria* (Purple Loosestrife)
- ☐ *Microstegium vimineum* (Japanese Stilt Grass)
- ☐ *Myriophyllum aquaticum, M. spicatum* (parrotfeather and Eurasion watermilfoil)
- ☐ *Phalaris arundianacea* (Reed Canary Grass)*
- ☐ *Phragmites australis* (Common Reed)
- ☐ *Polygonum cuspidatum* (Japanese knotweed)
- ☐ *Rhamnus cathartica* (Common Buckthorn)
- ☐ *Rosa multiflora* (Multiflora Rose)
- ☐ *Typha ssp.* (Cattail species)*
- ☐ 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.



		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 21

Site: w1001	**Rater(s):** BRH	**Date:** 5/24/21

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** 1

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	3	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	4	20
Metric 5: Special Situations	0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	1	20

Total Score = 21 **100 pts. Max.**

Site: w1001	Rater(s): BRH	Date: 5/24/21

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 (24hr)** **Start:** 13:32 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 12 ft
Maximum Depth 1 ft
Reach Length 44 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐P.C.	Riffle 20 %	Run 60 %	Pool 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 Score 5	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 not new fall and not 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 16	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). (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 8	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 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, (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 3	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 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 6 / 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

96

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s002 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 4/6/2020 | **TIME (24hr)** **Start:** 14:40 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 15 ft
Maximum Depth 0.66 ft
Reach Length 203 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
1 Riffle 1 Run 1 Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ☐ Herbaceous
☐ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 7	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 not new fall and not 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 11	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 0	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 2	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 0	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 3	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 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

91

NOTES/COMMENTS:

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 (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
■ Perennial
☐ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 50 ft
Maximum Depth 1.33 ft
Reach Length 874 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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:
☐ 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 not 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.
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

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 (24hr)** **Start:** 13:10 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
■ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
■ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.08 ft
Reach Length 100 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
■ Dry
☐ Pooled
☐ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 12	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). (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 13	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 0	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 5	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 (24hr)** **Start:** 13:34 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.25 ft
Reach Length 35 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
- ■ Trees ☐ Herbaceous
- ☐ Grasses ■ Shrubs

Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not new fall and not 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). (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 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	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 4/7/2020 | **TIME (24hr)** **Start:** 13:58 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
■ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
■ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.08 ft
Reach Length 110 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
■ Dry
☐ Pooled
☐ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
☐ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not new fall and not 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). (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 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	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

83

NOTES/COMMENTS:

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 (24hr)** **Start:** 14:05 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.25 ft
Reach Length 77 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
- ■ Trees ☐ Herbaceous
- ☐ Grasses ■ Shrubs

Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐P.C.	Riffle_____%	Run_____%	Pool_____%	Reach Total
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 not new fall and not 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). (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 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	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

83

NOTES/COMMENTS:

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 (24hr)** **Start:** 14:55 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.58 ft
Reach Length 91 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
- ■ Trees ☐ Herbaceous
- ☐ Grasses ■ Shrubs

Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 8	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 not new fall and not 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 16	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). (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 11	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 19	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 6	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 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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 4/7/2020 | **TIME (24hr)** **Start:** 15:55 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.17 ft
Reach Length 37 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ☐ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 5	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 not new fall and not 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 7	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). (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 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 19	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	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

87

NOTES/COMMENTS:

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 (24hr)** **Start:** 17:19 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.33 ft
Reach Length 194 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
- ■ Trees ☐ Herbaceous
- ☐ Grasses ■ Shrubs

Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 2	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 not new fall and not 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 6	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). (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 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 19	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	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

83

NOTES/COMMENTS:

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 (24hr)** **Start:** 17:18 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.08 ft
Reach Length 51 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
- ■ Trees ☐ Herbaceous
- ☐ Grasses ■ Shrubs

Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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:

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 2	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 not new fall and not 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 6	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). (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 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 19	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	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

83

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s101 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 4/6/2020 | **TIME (24hr)** **Start:** 15:36 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 8 ft
Maximum Depth 0.66 ft
Reach Length 64 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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.
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 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 4/7/2020 | **TIME (24hr)** **Start:** 13:42 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1.5 ft
Maximum Depth 0.33 ft
Reach Length 259 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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	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 not 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.
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 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 4/7/2020 | **TIME (24hr)** **Start:** 15:53 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.25 ft
Reach Length 39 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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 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.
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 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 (24hr)** **Start:** 16:32 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0 ft
Reach Length 95 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not new fall and not 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

86

NOTES/COMMENTS:

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 (24hr)** **Start:** 12:02 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.33 ft
Reach Length 51 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐P.C.	Riffle_____%	Run_____%	Pool_____%	Reach Total
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 Score 4	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 not new fall and not 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 5	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 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	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

94

NOTES/COMMENTS:

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 (24hr)** **Start:** 12:31 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.143974		
LONG	-87.978880		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
■ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
☐ Ephemeral
■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
x	x Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 7 ft
Maximum Depth 0.5 ft
Reach Length 158 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata 2 Dom.
Tree/Shrub Taxa
sycamore, hackberry

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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 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.
Left/Right Bank	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 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:** **PROJECT:**

INVESTIGATORS: Kaitlin Hillier | **DATE:** 4/7/2020 | **TIME (24hr)** **Start:** 15:38 **Finish:** 16:15

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.143350		
LONG	87.987398		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
■ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
☐ Ephemeral
■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
x	x Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
☐ Surface Mining ☐ Deep Mining ☐ Oil Wells ☐ Land Disposal ☐ Residential
☐ Construction ☐ Commercial ☐ Industrial ■ Row Crops
■ Forest ☐ Pasture/Grazing ☐ Silviculture ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 20 ft
Maximum Depth 1 ft
Reach Length 823 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams ☐ Bridge Abutments ☐ Island ☐ Waterfalls ☐ Other:

STREAM FLOW
☐ Dry ■ Pooled ☐ Low ☐ High ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous ☐ Grasses ■ Shrubs
Number of strata 3 Dom. Tree/Shrub Taxa
sycamore, sugarberry

CHANNEL ALTERATIONS
☐ Dredging ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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	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.
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 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:** **PROJECT:**

INVESTIGATORS: Kaitlin Hillier | **DATE:** 4/7/2020 | **TIME (24hr)** **Start:** 16:55 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.140020		
LONG	-87.990335		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
■ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
■ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
x	x Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
☐ Surface Mining ☐ Deep Mining ☐ Oil Wells ☐ Land Disposal ☐ Residential
☐ Construction ☐ Commercial ☐ Industrial ■ Row Crops
■ Forest ☐ Pasture/Grazing ☐ Silviculture ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 12 ft
Maximum Depth 1 ft
Reach Length 494 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams ☐ Bridge Abutments ☐ Island ☐ Waterfalls ☐ Other:

STREAM FLOW
■ Dry ■ Pooled ☐ Low ☐ High ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous ☐ Grasses ☐ Shrubs
Number of strata 2 Dom. Tree/Shrub Taxa
osage orange, sugarberry, black walnut

CHANNEL ALTERATIONS
☐ Dredging ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF _____ Seine _____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 debri

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 not 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 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.
Left/Right Bank	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 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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.124554		
LONG	-87.953934		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.3 ft
Reach Length 237 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 10	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 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 13	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 8	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 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 14 / RB 14	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

111

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1002 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.123759		
LONG	-87.950983		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.3 ft
Reach Length 199 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 13	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 14	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 9	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 9	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, (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	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.120636		
LONG	-87.950141		

CANOPY COVER::
☐ Fully Exposed (0-25%)
■ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
■ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
☐ Surface Mining ☐ Deep Mining ☐ Oil Wells ☐ Land Disposal ☐ Residential
☐ Construction ☐ Commercial ☐ Industrial ☐ Row Crops
☐ Forest ■ Pasture/Grazing ☐ Silviculture ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.2 ft
Reach Length 272 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams ☐ Bridge Abutments ☐ Island ☐ Waterfalls ☐ Other:

STREAM FLOW
☐ Dry ☐ Pooled ■ Low ☐ High ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous ■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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 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.
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 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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.120521		
LONG	-87.951834		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ■ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.2 ft
Reach Length 123 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ■ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 11	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 4	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 10	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 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 8	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 5	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 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

73

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1005 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132256		
LONG	-87.960708		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
☐ Ephemeral
■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 10 ft
Maximum Depth 1 ft
Reach Length 498 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 16	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 not new fall and not 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 13	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 11	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 8	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 15	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 13	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	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132713		
LONG	-87.960282		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.2 ft
Reach Length 170 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 12	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 10	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 8	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 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 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, (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 16	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132152		
LONG	-87.958901		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

	Now	Past 24 hours
	☐	☐ Heavy rain
	☐	☐ Steady rain
	☐	☐ Intermittent showers
	☐	☐ Clear/sunny
	☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.4 ft
Reach Length 68 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.13272		
LONG	-87.960861		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.1 ft
Reach Length 138 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.136046		
LONG	-87.956854		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 4 ft
Maximum Depth 0.4 ft
Reach Length 143 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 11	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 not new fall and not 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 12	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 11	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 10	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 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 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, (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 12	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132206		
LONG	-87.965785		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
■ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.1 ft
Reach Length 157 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131959		
LONG	-87.96624		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.2 ft
Reach Length 348 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 13	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 not new fall and not 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 15	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 14	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 10	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 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, (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 11	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 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 (24hr)** **Start:** 13:32 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 6 ft
Maximum Depth 0.5 ft
Reach Length 56 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ■ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 11	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 not new fall and not 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 12	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 10	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 12	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 15	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 12	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	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:** **PROJECT:**

INVESTIGATORS: Ben Hess **DATE:** 5/25/2021 **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ■ Perennial
- ☐ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 8 ft
Maximum Depth 0.5 ft
Reach Length 833 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 6	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 11	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 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, (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 8	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 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

85

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1014 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.138554		
LONG	-87.961015		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
☐ Ephemeral
■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.3 ft
Reach Length 209 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 14	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 not new fall and not 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 14	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 15	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 10	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 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 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, (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	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:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.138547		
LONG	-87.960998		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.3 ft
Reach Length 212 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
- ■ Trees ☐ Herbaceous
- ■ Grasses ☐ Shrubs

Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 10	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 10	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 9	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 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, (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	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

88

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1016 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.139818		
LONG	-87.962831		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.4 ft
Reach Length 120 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 5	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 not new fall and not 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 6	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 8	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 6	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, (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 8	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 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 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

76

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1017 (Hewlett Creek) | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ■ Perennial
- ☐ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 6 ft
Maximum Depth 0.5 ft
Reach Length 53 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 6	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 11	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 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, (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 8	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 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 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

85

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1018 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Hess | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.964209		
LONG	-87.139162		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
■ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	■ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.2 ft
Reach Length 45 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.133501		
LONG	-87.988105		

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.4 ft
Reach Length 410 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 8	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 not new fall and not 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 5	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 6	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 9	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 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 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, (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 5	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 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

77

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1102 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132858		
LONG	-87.992157		

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 0.4 ft
Maximum Depth 0.2 ft
Reach Length 351 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 8	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 not new fall and not 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 5	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 9	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 8	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 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 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, (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 9	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 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

90

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1103 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132562		
LONG	87.988276		

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

	Now	Past 24 hours
	☐	☐ Heavy rain
	☐	☐ Steady rain
	☐	☐ Intermittent showers
	☐	☐ Clear/sunny
	☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 0.8 ft
Maximum Depth 0.4 ft
Reach Length 101 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.130842		
LONG	-87.977754		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1.3 ft
Maximum Depth 0.3 ft
Reach Length 24 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 7	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 not new fall and not 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 4	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 4	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 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 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 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, (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 5	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 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 75

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1105 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.134289		
LONG	-87.977538		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
■ Partially Shaded (50-75%)
■ Fully Shaded (75-100%)

STREAM TYPE:
■ Perennial
☐ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	■ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	■ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 10 ft
Maximum Depth 0.5 ft
Reach Length 935 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
■ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 13	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 not new fall and not 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 11	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 10	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 10	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 13	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 13	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 12	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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131785		
LONG	87.977845		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.3 ft
Reach Length 32 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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 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.
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

114

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1107 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131785		
LONG	87.977845		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.3 ft
Reach Length 148 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.137473		
LONG	-87.980701		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☒ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☒ Perennial
☐ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ☒ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☒ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☒ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.3 ft
Reach Length 120 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☒ Pooled
☐ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☒ Trees ☒ Herbaceous
☒ Grasses ☒ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 10	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 6	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 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 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, (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	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 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

93

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1109 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 2 ft
Reach Length 16 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 5	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 6	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 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 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 4	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	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 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 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 74

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1110 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.136281		
LONG	-87.972373		

CANOPY COVER::
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☒ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☒ Perennial
☐ Ephemeral
☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ☒ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☒ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☒ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 12 ft
Maximum Depth 1 ft
Reach Length 1152 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
☐ Dry
☐ Pooled
☒ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☒ Trees ☒ Herbaceous
☒ Grasses ☒ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 12	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 not new fall and not 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 11	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 11	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 10	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 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 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, (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 13	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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.135519		
LONG	-87.983252		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ■ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.3 ft
Reach Length 553 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 5	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 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 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, (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	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 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

82

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1112 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.135519		
LONG	-87.983252		

CANOPY COVER::
☐ Fully Exposed (0-25%)
■ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

STREAM TYPE:
☐ Perennial
☐ Ephemeral
■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days?
☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):

☐ Surface Mining	☐ Construction	■ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers
☐ Residential		

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.5 ft
Reach Length 187 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
☐ Dams
☐ Bridge Abutments
☐ Island
☐ Waterfalls
☐ Other:

STREAM FLOW
■ Dry
☐ Pooled
☐ Low
☐ High
☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
☐ Dredging
☐ Channelization
(☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 5	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 not new fall and not 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 10	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 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 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 8	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 8	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 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

82

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1113 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132647		
LONG	-87.982599		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2.5 ft
Maximum Depth 0.4 ft
Reach Length 163 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 6	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 9	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 8	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, (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	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

100

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1114 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132599		
LONG	-87.982749		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.4 ft
Reach Length 24 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 **Score** 10	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 not new fall and not 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** 10	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** 9	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** 10	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** 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, (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** 13	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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132975		
LONG	87.981890		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.2 ft
Reach Length 60 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132419		
LONG	87.981618		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1 ft
Maximum Depth 0.2 ft
Reach Length 28 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.138021		
LONG	-87.974895		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.4 ft
Reach Length 38 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 11	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 not new fall and not 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 10	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 9	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 10	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 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, (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	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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.137664		
LONG	-87.974793		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1.5 ft
Maximum Depth 0.3 ft
Reach Length 31 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 9	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 not new fall and not 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 10	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 11	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 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 13	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	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: s1119 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.137226		
LONG	-87.974010		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ■ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 5 ft
Maximum Depth 0.4 ft
Reach Length 27 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 11	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 10	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 10	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 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, (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 11	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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.132690		
LONG	-87.973398		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.2 ft
Reach Length 600 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 8	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 not new fall and not 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 10	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 9	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 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 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, (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 11	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

96

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1121 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131652		
LONG	-87.972956		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1.5 ft
Maximum Depth 0.2 ft
Reach Length 20 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 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 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 8	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, (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 8	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

95

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1122 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131463		
LONG	-87.973578		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.2 ft
Reach Length 137 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 11	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 7	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 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 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, (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 11	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 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

100

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1123 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.141094		
LONG	87.966179		

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 0.2 ft
Reach Length 134 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ■ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
☐ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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 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:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131463		
LONG	-87.973578		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 3 ft
Maximum Depth 1.5 ft
Reach Length 49 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 6	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 not new fall and not 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 10	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 6	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 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 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, (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 11	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

91

NOTES/COMMENTS:

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1125 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Crystal Renskers | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.131463		
LONG	-87.973578		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 1.3 ft
Maximum Depth .4 ft
Reach Length 24 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 8	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 not new fall and not 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 4	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 6	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 7	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 6	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, (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 11	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 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 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

84

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1201 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.148864		
LONG	-87.975111		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 4 ft
Maximum Depth 1 ft
Reach Length 82 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.145848		
LONG	-87.973862		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.5 ft
Reach Length 346 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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 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:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ■ Perennial
- ☐ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

	Now	Past 24 hours
	☐	☐ Heavy rain
	☐	☐ Steady rain
	☐	☐ Intermittent showers
	☐	☐ Clear/sunny
	☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 16 ft
Maximum Depth 1 ft
Reach Length 651 m
Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 16	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 not new fall and not 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 15	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 14	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 12	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 15	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 13	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 11	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 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:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 8 ft
Maximum Depth 0.5 ft
Reach Length 105 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ☐ Herbaceous
■ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 10	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 not new fall and not 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 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 11	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 6	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, (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 7	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 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

92

NOTES/COMMENTS:

Low Gradient Bioassessment Stream Visit Sheet

STREAM NAME: s1205 | **LOCATION:** Fredonia, KY

STATION #: | **COUNTY:** Caldwell, KY | **PROGRAM:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** 11:37 **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.148864		
LONG	-87.975111		

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.8 ft
Reach Length 1149 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT	37.144180		
LONG	-87.971343		

CANOPY COVER::
- ■ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ■ Ephemeral
- ☐ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ■ Row Crops
- ☐ Forest
- ■ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 2 ft
Maximum Depth 0.5 ft
Reach Length 815 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ■ Dry
- ☐ Pooled
- ☐ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
☐ Grasses ☐ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 not 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.
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 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:** **PROJECT:**

INVESTIGATORS: Ben Harvey | **DATE:** 5/25/2021 | **TIME (24hr)** **Start:** **Finish:**

Verify Site LAT/LONG vs GPS ☐YES ☐NO ☐N/A

	Station	Reach Downstream	Reach Upstream
LAT			
LONG			

CANOPY COVER::
- ☐ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ■ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

STREAM TYPE:
- ☐ Perennial
- ☐ Ephemeral
- ■ Intermittent

WEATHER
Has there been a scouring rain in the last 14 days? ☐ Yes ■ No

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☐ Intermittent showers
☐	☐ Clear/sunny
☐	☐ Cloudy

LOCAL WATERSHED FEATUREES (Predominant Surrounding Land Use):
- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Residential
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ■ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

INSTREAM FEATURES
Stream Width 5 ft
Maximum Depth 1.2 ft
Reach Length 136 m

Riffle/Run/Pool Sequence (No. Sampled in Reach)
_____Riffle _____Run _____Pool

HYDRAULIC STRUCTURES
- ☐ Dams
- ☐ Bridge Abutments
- ☐ Island
- ☐ Waterfalls
- ☐ Other:

STREAM FLOW
- ☐ Dry
- ☐ Pooled
- ■ Low
- ☐ High
- ☐ Normal

RIPARIAN VEGETATION
Dominate Type:
■ Trees ■ Herbaceous
■ Grasses ■ Shrubs
Number of strata ____ Dom. Tree/Shrub Taxa

CHANNEL ALTERATIONS
- ☐ Dredging
- ☐ Channelization (☐Full ☐Partial)

P-CHEM Instrument Used: _____ Date Calibrated: _____

Temp(°C)_____ D.O. (mg/l)_____ %Saturation_____ pH(S.U.)_____ Cond._____ Turb._____

Sample Collection Verification

Algae	Sample: ☐ QualMHC ☐ Other ☐ Visual Assessment	Lead Collector:
Fish	☐BPEF ☐ Seine ☐ Other Time: BPEF_____ Seine_____	Lead Collector:
Habitat	☐ RBP ☐ Substrate ☐ Other:	Lead Collector:
Invertebrates	☐ 1m² ☐ Qual ☐ Other:	Lead Collector:
	☐ 20 Jab (#Jabs: Cobble_____ Snags_____ Veg. Banks_____ Sand_____ Macrophytes_____ Other _____)	
Tissue:	No. of Samples collected_____ Sp:	Lead Collector:
Water Chem	☐ Acid/Alk ☐ Bulk ☐ Nutrients ☐ Metals ☐ Low Hg	Lead Collector:
	☐ Herbicides ☐ Pesticides ☐ Ortho P ☐ Other:	

Duplicate Samples Taken:

Substrate Characterization

Substrate ☐Est. ☐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 Score 12	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 not new fall and not 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 12	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 14	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 11	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 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 12	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 8	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 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 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

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.

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