

Appendix K

WILDLIFE HABITAT ASSESSMENT

Mantle Rock Solar LLC

Livingston County, Kentucky



COPPERHEAD
ENVIRONMENTAL CONSULTING

Sensitive Species Habitat Assessment for the Mantle Rock Solar Project, Livingston County, Kentucky



June 2023

COPPERHEAD ENVIRONMENTAL CONSULTING, INC.

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INTRODUCTION

Copperhead Environmental Consulting Inc. (Copperhead) was contracted by Enerfin Renewables, LLC to complete sensitive species habitat assessment for the proposed Mantle Rock Solar Project (Project) in Livingston County, Kentucky. The Project is situated on approximately 537 acres (the “Project Area”) near Hampton, Kentucky (Figure 1 – Appendix A). The field habitat survey was completed 10-13 April 2023.

HABITAT ASSESSMENT

Desktop Review

Copperhead biologists conducted a desktop review of the Project Area in April 2023 using Google Earth satellite imagery. The USFWS IPaC Tool identified 16 federally listed species that could potentially occur within the Project Area; including three mammal species, one bird species, ten clam species, one insect species (candidate species), and one flowering plant species (Appendix B). The IPAC tool also identified 8 migratory birds listed as USFWS Birds of Conservation Concern that are most likely to be present and breeding within the project area. The Office of Kentucky Nature Preserves (OKNP) also has four monitored species that were previously found within 1 mile of the project area.

Table 1. Federally and State-listed or Protected Terrestrial Animal and Plant Species Potentially Found within the Mantle Rock Solar Project Area, Livingston County, Kentucky.

Common Name	Scientific Name	Federal Status	State Status
Mammals			
Gray Bat	<i>Myotis grisescens</i>	LE	N
Indiana Bat	<i>Myotis sodalis</i>	LE	LE
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	LE	LE
Birds			
Whooping Crane	<i>Grus americana</i>	EP	N
Mussels			
Clubshell	<i>Pleurobema clava</i>	LE	LE
Fanshell	<i>Cyprogenia stegaria</i>	LE	LE
Fat Pocketbook	<i>Potamilus capax</i>	LE	LT
Longsolid	<i>Fusconaia subrotunda</i>	LT	S
Northern Riffleshell	<i>Epioblasma rangiana</i>	LE	LE
Orangefoot Pimpleback	<i>Plethobasus cooperianus</i>	LE	LE
Pink Mucket	<i>Lampsilis abrupta</i>	LE	LE
Rabbitsfoot	<i>Quadrula cylindrica</i>	LT	LE
Ring Pink	<i>Obovaria retusa</i>	LE	LE
Rough Pigtoe	<i>Pleurobema plenum</i>	LE	LE
Insects			
Monarch Butterfly	<i>Danaus plexippus</i>	LC	N
Plants			
Price's Potato-bean	<i>Apios priceana</i>	LT	N

Sources: USFWS IPaC Resource List, accessed 05/01/2023 at <https://ecos.fws.gov/ipac>;

* LE= Listed Endangered; LT = Listed Threatened; EP = Listed Experimental Population, Non-Essential; LC = Listed Candidate; S = Special Concern Species; N = None

Table 2. Migratory Birds of Conservation Concern Potentially Found in the Mantle Rock Solar Project Area, Livingston County, Kentucky.

Common Name	Scientific Name
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Chimney Swift	<i>Chaetura pelagica</i>
Field Sparrow	<i>Spizella pusilla</i>
Kentucky Warbler	<i>Oporornis formosus</i>
Prairie Warbler	<i>Dendroica discolor</i>
Prothonotary Warbler	<i>Protonotaria citrea</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Wood Thrush	<i>Hylocichla mustelina</i>

Source: USFWS IPaC Resource List, accessed 05/01/2023 at <https://ecos.fws.gov/ipac>

Table 3. Office of Kentucky Nature Preserves Monitored Species Previously Found within 1 Mile of the Mantle Rock Solar Project Area, Livingston County, Kentucky.

Common Name	Scientific Name	State Rank	OKNP Status	Federal Status	Potential Habitat
Birds					
Loggerhead Shrike	<i>Lanius ludovicianus</i>	S3S4B, S4N	S	-	Present
Amphibians					
Northern Crawfish Frog	<i>Lithobates areolatus circulosus</i>	S3	S	-	Present
Mammals					
Southeastern Myotis	<i>Myotis austroriparius</i>	S3	S	-	Present
Plants					
Buffalo Clover	<i>Trifolium reflexum</i>	S1S2	E	-	Present

Source: OKNP Biological Assessment Tool, accessed 04/18/2023 at <https://kynaturepreserves.org/>

* S3 = Uncommon; S4 = Many Occurrences; B = Breeding Population; N = Non-Breeding Population; S1 = Extremely Rare; S2 = Rare; S = Special Concern Species; E = Endangered

Table 4. Kentucky Department of Fish and Wildlife Resources State Threatened, Endangered, and Special Concern Species in the Golconda Quad.

Common Name	Scientific Name	State Status	Federal Status	Potential Habitat
Fish				
Black Buffalo	<i>Ictiobus niger</i>	S	N	No
Lake Chubsucker	<i>Erimyzon sucetta</i>	LT	N	Present
Mississippi Silverside	<i>Menidia audens</i>	LT	N	No
Birds				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S	N	Present
Bank Swallow	<i>Riparia riparia</i>	S	N	No
Bell's Vireo	<i>Vireo bellii</i>	S	N	Present
Bobolink	<i>Dolichonyx oryzivorus</i>	S	N	Present
Cattle Egret	<i>Bubulcus ibis</i>	S	N	Present
Fish Crow	<i>Corvus ossifragus</i>	S	N	No
Great Egret	<i>Ardea alba</i>	LT	N	No
Henslow's Sparrow	<i>Centronyx henslowii</i>	S	N	Present
Hooded Merganser	<i>Lophodytes cucullatus</i>	LT	N	Present
Interior Least Tern	<i>Sternula antillarum athalassos</i>	LE	N	No
Loggerhead Shrike	<i>Lanius ludovicianus</i>	S	N	Present
Osprey	<i>Pandion haliaetus</i>	S	N	No
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S	N	Present
Yellow-crowned Night-heron	<i>Nyctanassa violacea</i>	LT	N	No
Mussels				
Elephantear	<i>Elliptio crassidens</i>	S	N	No
Fat pocketbook	<i>Potamilus capax</i>	LT	LE	No
Pocketbook	<i>Lampsilis ovata</i>	LE	N	No

Salamander Mussel	<i>Simpsonaias ambigua</i>	LT	N	No
Crayfish				
Crawzilla Crawdad	<i>Lacunicambarus chimera</i>	S	N	Present
Kentucky Crayfish	<i>Faxonius kentuckiensis</i>	LT	N	Present
Livingston Crayfish	<i>Faxonius margorectus</i>	S	N	Present
Amphibians				
Northern Crawfish Frog	<i>Lithobates areolatus circulosus</i>	S	N	Present
Mammals				
Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	LE	LT	Present
Reptiles				
Copperbelly Watersnake	<i>Nerodia erythrogaster neglecta</i>	LT	N	Present

Source: Kentucky Department of Fish and Wildlife Resources, accessed 05/03/2023 at

<http://app.fw.ky.gov/speciesinfo/QuadListSpecies.asp>

* LE= Listed Endangered; LT = Listed Threatened; S = Special Concern Species; N = None

Field Assessment

Copperhead performed a field assessment in the project area on 10-13 April 2023 to evaluate the presence of potential habitat for listed plant and wildlife species and to record listed species observations. Plant and wildlife species were documented through visual confirmation in the field. Though much of the project area is comprised of pasture, all fields were searched for potential habitat. Representative photographs of habitat and plants encountered are included in Appendix C.

Forested areas, totaling 76.7 acres, were identified within the project area as having potential habitat for multiple species (Figure 2.1 – Appendix A). These forested areas are comprised of a mixed oak/hickory deciduous forest, with shagbark hickory (*Carya ovata*), northern red oak (*Quercus rubra*), boxelder maple (*Acer negundo*) and red maple (*Acer rubrum*) being the dominant tree species. Other species such as Chinese privet (*Ligustrum sinense*) and poison ivy (*Toxicodendron radicans*) were observed throughout the areas. Multiple streams and one wetland were found within these forested areas. Along those features, American sycamore (*Platanus occidentalis*), common persimmon (*Diospyros virginiana*), green ash (*Fraxinus pennsylvanica*), and Carex species were observed.

Downed trees, snags, and shagbark hickory trees were found throughout all of the forested areas, which are habitat for the Indiana bat and northern long-eared. A query with the Kentucky Speleological Survey shows known habitat and swarming habitat for the Indiana bat within the project area and known habitat for the northern long-eared bat in the surrounding areas of the project area (Figure 2.2 – Appendix A). Nine caves are located within five miles of the project area, providing habitat for the gray bat and hibernacula habitat for the Indiana bat and northern long-eared bat (Figure 2.2 – Appendix A). Three on-site agricultural buildings and one off-site church also provide habitat for all three species (Figure 2.1 – Appendix A).

Suitable habitat exists for all eight of the migratory bird species identified by the USFWS IPAC tool (bald eagle, chimney swift, field sparrow, Kentucky warbler, prairie warbler, prothonotary warbler, red-headed woodpecker, and wood thrush). Though none of the species were observed during the field assessment, the forested areas are suitable habitat for the bald eagle, chimney swift, Kentucky warbler, prairie warbler, prothonotary warbler, red-headed woodpecker, and wood thrush and the forest edge is suitable habitat for the field sparrow. According to entries of bird sightings on ebird.org, 1 bald eagle, 2 chimney swifts, 3 field sparrows, 1 Kentucky warbler, 4 prairie warblers, 1 prothonotary warbler, 1 red-headed woodpecker, and 1 wood thrush have been observed within Livingston county; with the most recent sightings of each of those species being in 2023. Per correspondence with USFWS, Whooping crane habitat is not a concern since the project is not within Hopkins, Hardin, or Barren counties, where wintering habitat is possible. No bald eagle or raptor nests were observed during field reconnaissance.

The monarch butterfly, an insect currently federally listed as a candidate species, was not observed during the field reconnaissance. Potential monarch habitat consists of common

milkweed (*Asclepias syriaca*) and swamp milkweed (*Asclepias incarnata*). Neither species was observed during field reconnaissance, however roadsides that are not mowed or grazed by livestock could potentially be habitat for common milkweed.

Suitable habitat was not found in the project area for any of the mussel species due to the small size of the majority of streams and a lack of constant flow in the larger streams. No mussels were observed during the field reconnaissance.

Suitable habitat for the Price's potato bean plant was observed in the project area (Figure 2.1). Habitat consists of wooded edges between forested areas and pasture.

CONCLUSIONS

General wildlife habitat is present throughout the Project Area, with proper habitat for state and federally listed species being the forested areas and roadsides. No state or federally listed threatened or endangered species were observed while in the field. There is potential monarch habitat in all un-disturbed field areas and potential habitat for all bat species in the forested areas and buildings. The forest edges also provide habitat for the Price's potato bean plant. While no migratory birds of conservation concern were observed, there is potential habitat in the project area for all eight species.

Literature Cited

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The Office of Kentucky Nature Preserves. 2023. Mantle Rock Solar Report generated through the Biological Assessment Tool. Biological Assessment Tool available at

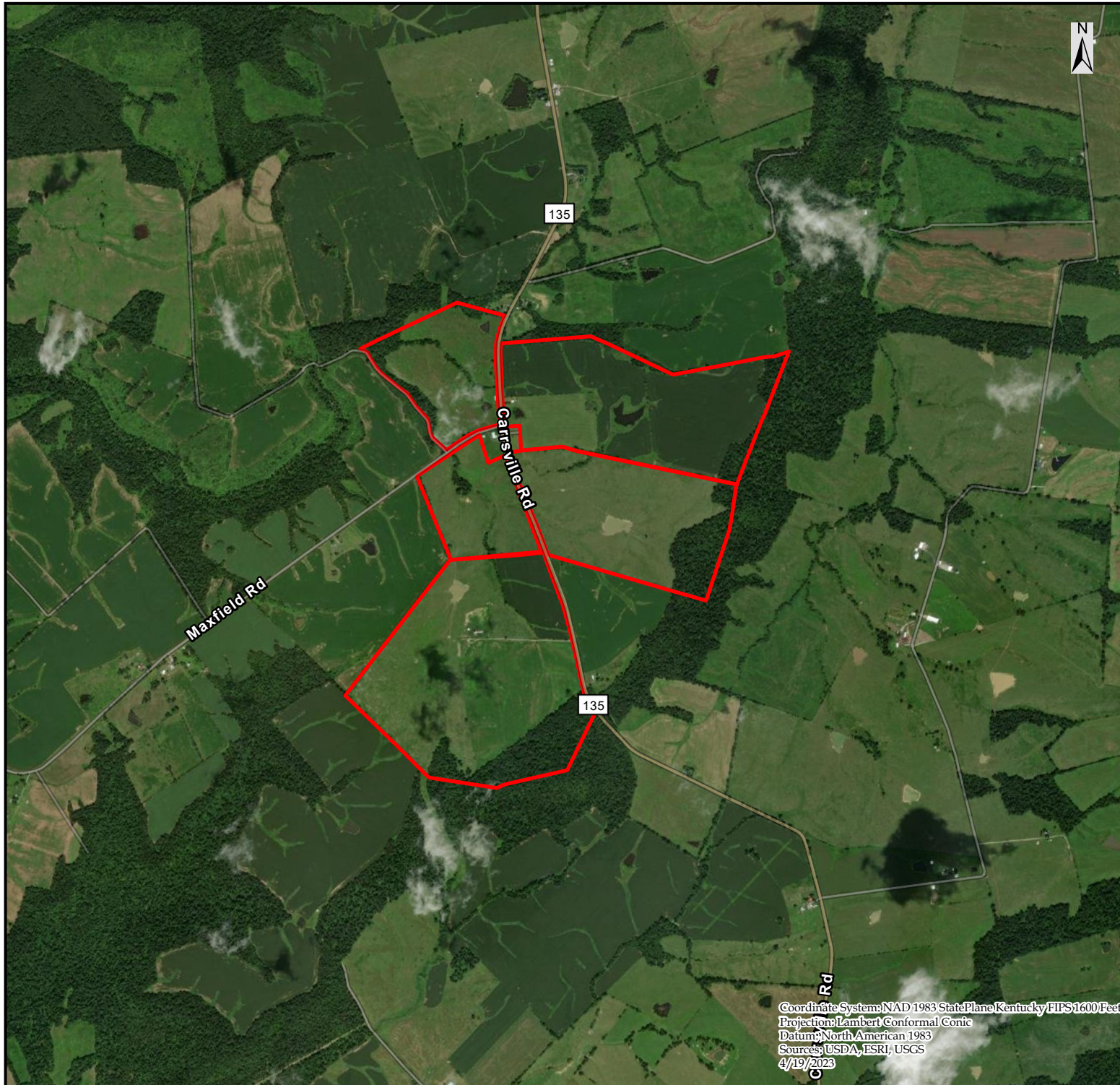
<https://kynaturepreserves.org/>

Kentucky, United States - ebird. Retrieved May 3, 2023, from

<https://ebird.org/region/US-KY>

Appendix A

Figures



Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Source: USDA, ESRI, USGS
4/19/2023



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Prepared for:

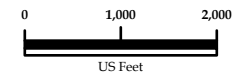
Enerfin Renewables, LLC

FIGURE 1:
Overview Map for the
Mantle Rock Solar Project

Livingston County, Kentucky

Legend

 Survey Area

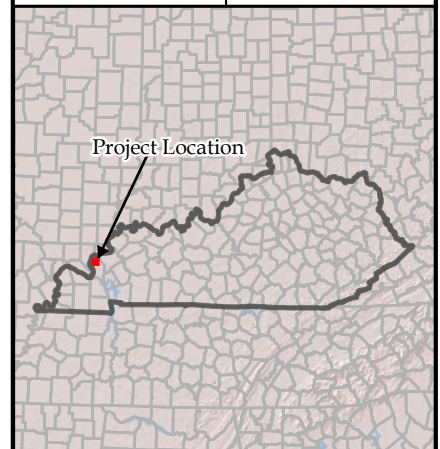


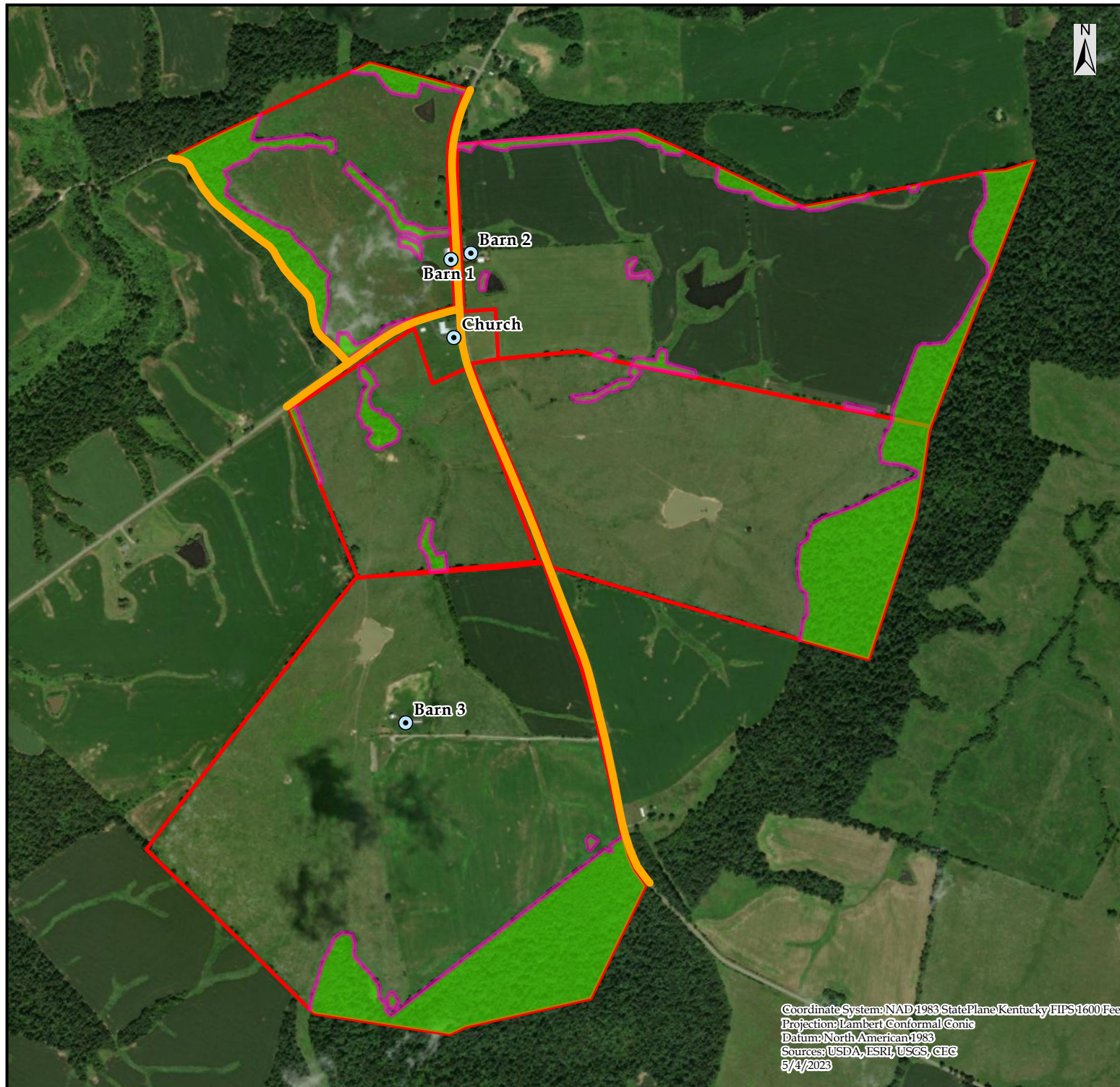
Scale: 1 in = 2,000 ft

Prepared by :

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Drawn by:	TC	Date:	4/19/2023
Checked by:	JM	Revision:	01





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Prepared for:

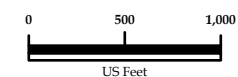
Enerfin Renewables, LLC

FIGURE 2.1:
Potential Threatened and Endangered
Species Habitat Map for the
Mantle Rock Solar Project

Livingston County, Kentucky

Legend

- Building Location
- Potential Monarch Habitat
- Potential Price's Potato Bean Habitat
- Forested Habitat
- Survey Area

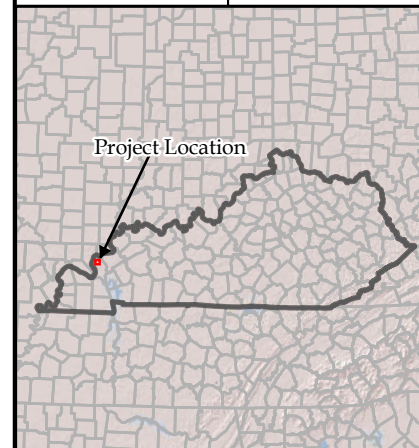


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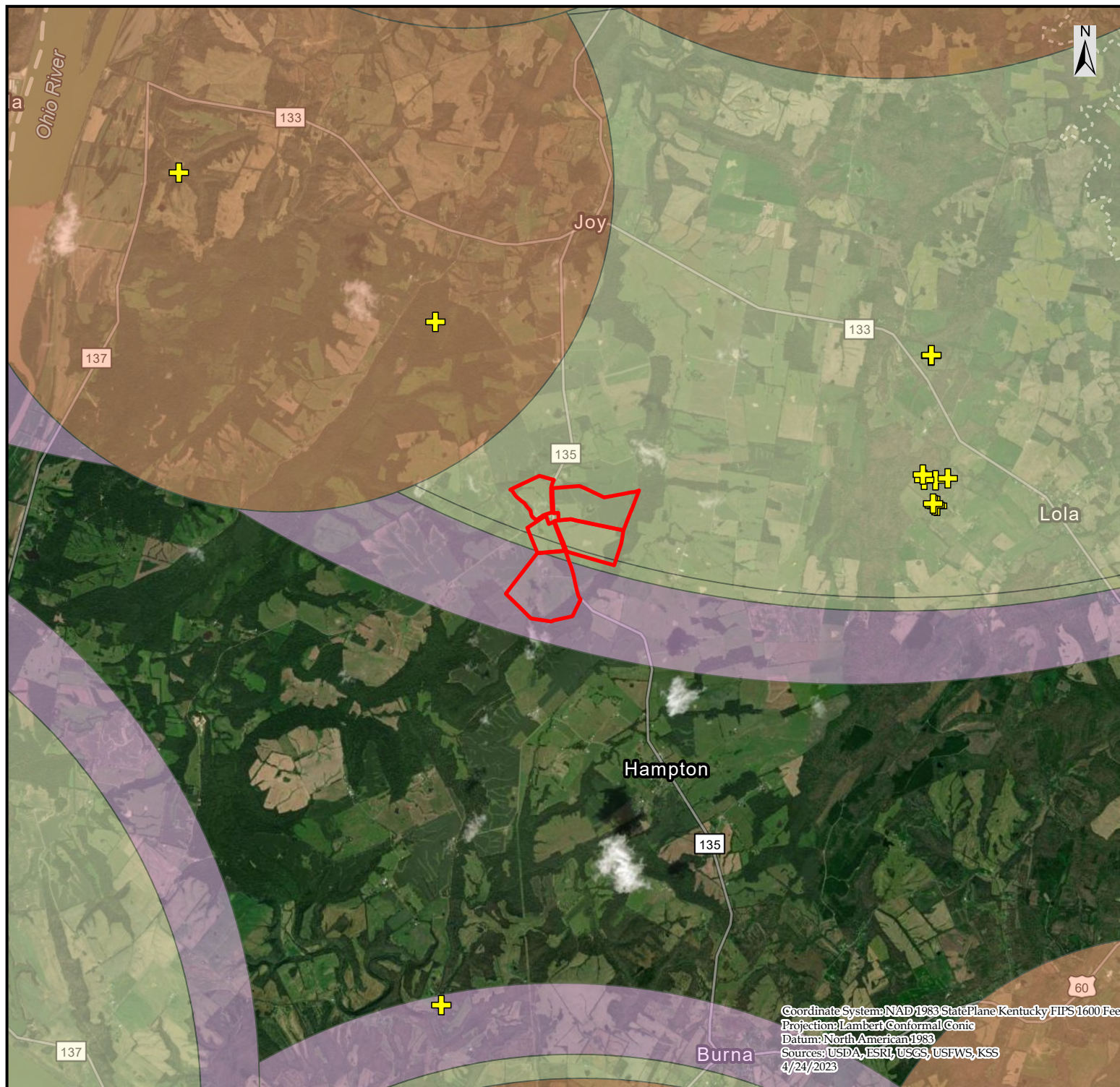
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Paint Lick, Kentucky 40461

Drawn by:	TC	Date:	5/4/2023
Checked by:	JM	Revision:	01



Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: USDA, ESRI, USGS, CEC
5/4/2023



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Prepared for:

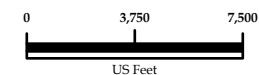
Enerfin Renewables, LLC

FIGURE 2.2:
Threatened and Endangered Species
Map for the Mantle Rock Solar Project

Livingston County, Kentucky

Legend

- + KSS Cave
- MYSE Known Habitat
- MYSO Known Habitat
- MYSO Swarming Habitat
- Survey Area

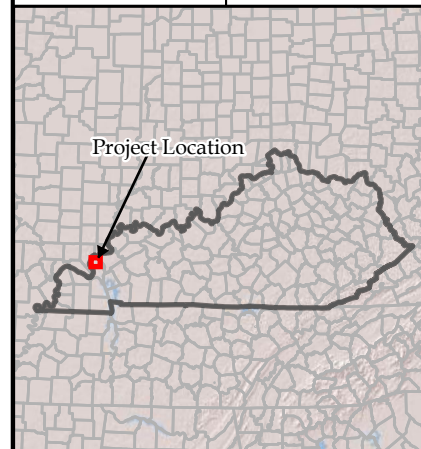


Scale: 1 in = 1 mi

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Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: USDA, ESRI, USGS, USFWS, KSS
4/24/2023

Appendix B

U.S. Fish and Wildlife Information for Planning and Consultation Request Official Species List and Draft Species List Including Migratory Birds, Kentucky Department of Fish and Wildlife Resources County Threatened and Endangered Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
Phone: (502) 695-0468 Fax: (502) 695-1024
Email Address: kentuckyes@fws.gov

In Reply Refer To:
Project Code: 2023-0072336
Project Name: Mantle Rock Solar

April 21, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/birds/policies-and-regulations.php>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Kentucky Ecological Services Field Office

J C Watts Federal Building, Room 265

330 West Broadway

Frankfort, KY 40601-8670

(502) 695-0468

PROJECT SUMMARY

Project Code: 2023-0072336

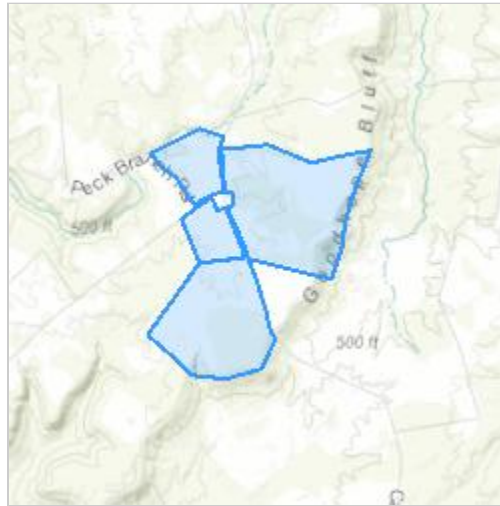
Project Name: Mantle Rock Solar

Project Type: Power Gen - Solar

Project Description: Proposed solar electric generating facility in Livingston County, Kentucky

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@37.315211500000004,-88.38506695163761,14z>



Counties: Livingston County, Kentucky

ENDANGERED SPECIES ACT SPECIES

There is a total of 16 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 10 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.
-

MAMMALS

NAME	STATUS
<p>Gray Bat <i>Myotis grisescens</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> ▪ The project area includes potential gray bat habitat. <p>Species profile: https://ecos.fws.gov/ecp/species/6329</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/6422.pdf</p>	Endangered
<p>Indiana Bat <i>Myotis sodalis</i></p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> ▪ The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species. ▪ The project area includes known 'swarming 1' habitat. <p>Species profile: https://ecos.fws.gov/ecp/species/5949</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/6422.pdf</p>	Endangered
<p>Northern Long-eared Bat <i>Myotis septentrionalis</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/9045</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/6422.pdf</p>	Endangered

BIRDS

NAME	STATUS
<p>Whooping Crane <i>Grus americana</i></p> <p>Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY)</p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/758</p>	Experimental Population, Non- Essential

CLAMS

NAME	STATUS
<p>Clubshell <i>Pleurobema clava</i></p> <p>Population: Wherever found; Except where listed as Experimental Populations</p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> The species may be affected by projects that significantly impact the Ohio River. <p>Species profile: https://ecos.fws.gov/ecp/species/3789</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf</p>	Endangered
<p>Fanshell <i>Cyprogenia stegaria</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> The species may be affected by projects that significantly impact the Ohio River. <p>Species profile: https://ecos.fws.gov/ecp/species/4822</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf</p>	Endangered
<p>Fat Pocketbook <i>Potamilus capax</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Clarks, Cumberland, Green, Mississippi, Ohio, Tradewater, or Tennessee. <p>Species profile: https://ecos.fws.gov/ecp/species/2780</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf</p>	Endangered
<p>Longsolid <i>Fusconaia subrotunda</i></p> <p>There is final critical habitat for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/9880</p>	Threatened
<p>Northern Riffleshell <i>Epioblasma rangiana</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio. <p>Species profile: https://ecos.fws.gov/ecp/species/527</p> <p>General project design guidelines:</p> <p>https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf</p>	Endangered
<p>Orangefoot Pimpleback (pearlymussel) <i>Plethobasus cooperianus</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> The species may be affected by projects that significantly impact the Ohio River. <p>Species profile: https://ecos.fws.gov/ecp/species/1132</p> <p>General project design guidelines:</p>	Endangered

NAME	STATUS
https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf Pink Mucket (pearlymussel) <i>Lampsilis abrupta</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7829 General project design guidelines: https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf	Endangered
Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> The species may be affected by projects that significantly impact the Ohio River. Species profile: https://ecos.fws.gov/ecp/species/5165 General project design guidelines: https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf	Threatened
Ring Pink (mussel) <i>Obovaria retusa</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> The species may be affected by projects that significantly impact the Ohio River. Species profile: https://ecos.fws.gov/ecp/species/4128 General project design guidelines: https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf	Endangered
Rough Pigtoe <i>Pleurobema plenum</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> The species may be affected by projects that significantly impact the Ohio River. Species profile: https://ecos.fws.gov/ecp/species/6894 General project design guidelines: https://ipac.ecosphere.fws.gov/project/2MV3SI4H3RDHXO73CCLWLL7SJE/documents/generated/5639.pdf	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
Price's Potato-bean <i>Apios priceana</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7422	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPAC USER CONTACT INFORMATION

Agency: Copperhead Environmental Consulting
Name: Jacob Murphy
Address: 471 Main St.
Address Line 2: P.O. Box 73
City: Paint Lick
State: KY
Zip: 40461
Email: jmurphy@copperheadconsulting.com
Phone: 5022107723

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

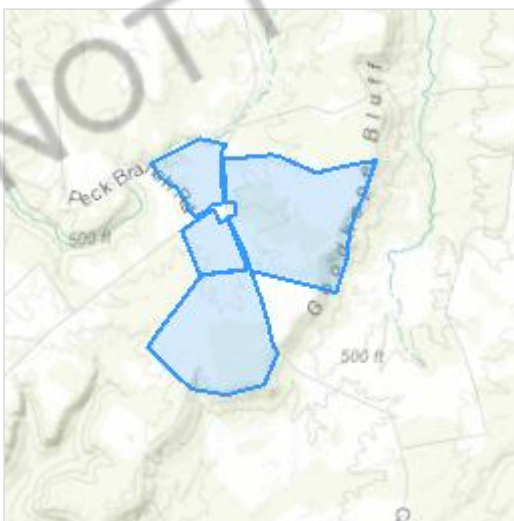
Project information

NAME

Mantle Rock Solar

LOCATION

Livingston County, Kentucky



DESCRIPTION

Some(Proposed solar electric generating facility in Livingston County, Kentucky)

Local office

Kentucky Ecological Services Field Office

☎ (502) 695-0468

📅 (502) 695-1024

✉ kentuckyes@fws.gov

J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
 2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of

Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
<p>Gray Bat <i>Myotis grisescens</i></p> <p>Wherever found</p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> The project area includes potential gray bat habitat. <p>No critical habitat has been designated for this species.</p> <p>https://ecos.fws.gov/ecp/species/6329</p>	Endangered
<p>Indiana Bat <i>Myotis sodalis</i></p> <p>Wherever found</p> <p>This species only needs to be considered if any of the following conditions apply:</p> <ul style="list-style-type: none"> The project area includes known 'swarming 1' habitat. The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species. <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>https://ecos.fws.gov/ecp/species/5949</p>	Endangered
<p>Northern Long-eared Bat <i>Myotis septentrionalis</i></p> <p>Wherever found</p> <p>No critical habitat has been designated for this species.</p> <p>https://ecos.fws.gov/ecp/species/9045</p>	Endangered

Birds

NAME	STATUS
<p>Whooping Crane <i>Grus americana</i></p> <p>No critical habitat has been designated for this species.</p> <p>https://ecos.fws.gov/ecp/species/758</p>	EXPN

Clams

NAME	STATUS
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Clubshell <i>Pleurobema clava</i> This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact the Ohio River. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3789	Endangered
Fanshell <i>Cyprogenia stegaria</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact the Ohio River. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4822	Endangered
Fat Pocketbook <i>Potamilus capax</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Clarks, Cumberland, Green, Mississippi, Ohio, Tradewater, or Tennessee. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2780	Endangered
Longsolid <i>Fusconaia subrotunda</i> Wherever found There is final critical habitat for this species. https://ecos.fws.gov/ecp/species/9880	Threatened
Northern Riffleshell <i>Epioblasma rangiana</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/527	Endangered

Orangefoot Pimpleback (pearlymussel) <i>Plethobasus cooperianus</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact the Ohio River. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1132	Endangered
Pink Mucket (pearlymussel) <i>Lampsilis abrupta</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7829	Endangered
Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact the Ohio River. There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5165	Threatened
Ring Pink (mussel) <i>Obovaria retusa</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact the Ohio River. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4128	Endangered
Rough Pigtoe <i>Pleurobema plenum</i> Wherever found This species only needs to be considered if the following condition applies: <ul style="list-style-type: none">• The species may be affected by projects that significantly impact the Ohio River. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6894	Endangered

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Price's Potato-bean <i>Apios priceana</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7422	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>

- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Field Sparrow <i>Spizella pusilla</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Aug 15
Kentucky Warbler <i>Oporornis formosus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20

Prairie Warbler *Dendroica discolor*

Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler *Protonotaria citrea*

Breeds Apr 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush *Hylocichla mustelina*

Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence

at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

- The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

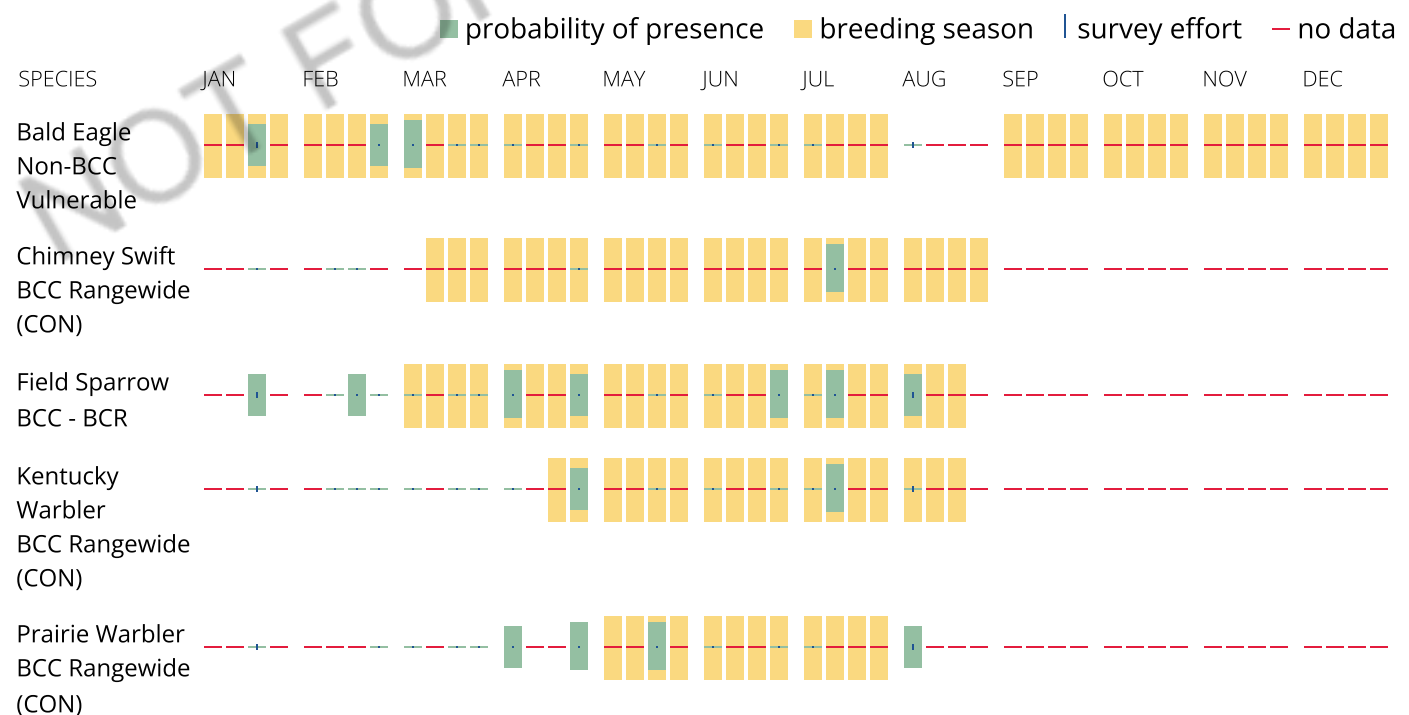
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

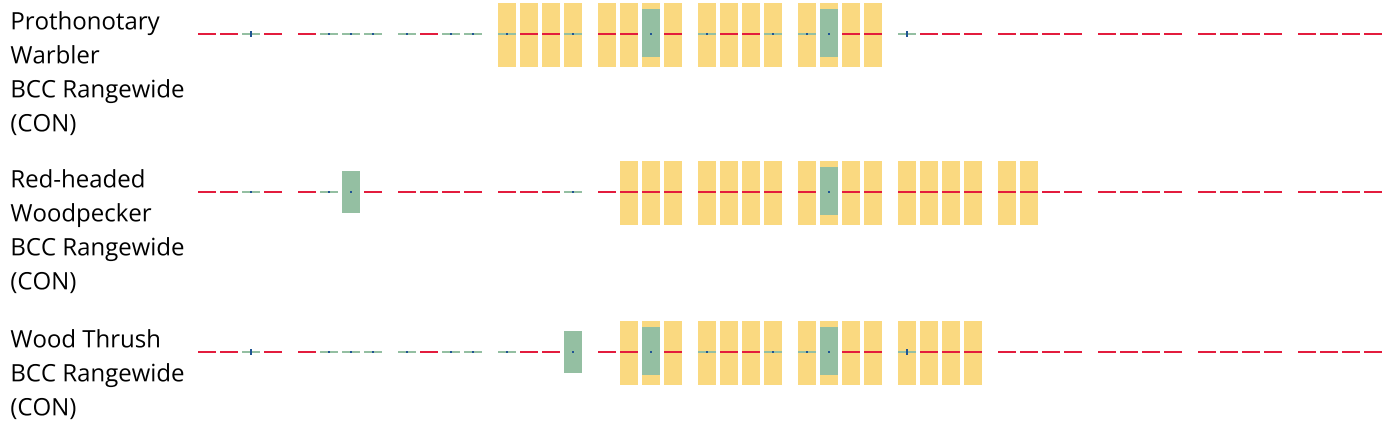
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

[PFO1A](#)

FRESHWATER POND

[PUBHh](#)

[PUSCh](#)

RIVERINE

[R4SBC](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.



Species Information

State Threatened, Endangered, and Special Concern Species observations for selected quads

Linked life history provided courtesy of NatureServe Explorer .
Records may include both recent and historical observations.
US Status Definitions Kentucky Status Definitions

List State Threatened, Endangered, and Special Concern Species observations in 1 selected quad.
Selected quad is: Golconda.

Scientific Name and Life History	Common Name and Pictures	Class	Quad	US Status	KY Status	WAP	Reference
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Aves	Golconda	N	S	Yes	Reference
<i>Riparia riparia</i>	Bank Swallow	Aves	Golconda	N	S	Yes	Reference
<i>Vireo bellii</i>	Bell's Vireo	Aves	Golconda	N	S	Yes	Reference
<i>Ictiobus niger</i>	Black Buffalo	Actinopterygii	Golconda	N	S	Yes	Reference
<i>Dolichonyx oryzivorus</i>	Bobolink	Aves	Golconda	N	S	Yes	Reference
<i>Bubulcus ibis</i>	Cattle Egret	Aves	Golconda	N	S		Reference
<i>Nerodia erythrogaster neglecta</i>	Copperbelly Watersnake	Reptilia	Golconda	N	T	Yes	Reference
<i>Lacunicambarus chimera</i>	Crawzilla Crawdad	Malacostraca	Golconda	N	S	Yes	Reference
<i>Elliptio crassidens</i>	Elephantear	Bivalvia	Golconda	N	S	Yes	Reference
<i>Potamilus capax</i>	Fat Pocketbook	Bivalvia	Golconda	E	T	Yes	Reference
<i>Corvus ossifragus</i>	Fish Crow	Aves	Golconda	N	S		Reference
<i>Ardea alba</i>	Great Egret	Aves	Golconda	N	T	Yes	Reference
<i>Centronyx henslowii</i>	Henslow's Sparrow	Aves	Golconda	N	S	Yes	Reference
<i>Lophodytes cucullatus</i>	Hooded Merganser	Aves	Golconda	N	T	Yes	Reference

<i>Sternula antillarum athalassos</i>	Interior Least Tern	Aves	Golconda	N	E	Yes	Reference
<i>Faxonius kentuckiensis</i>	Kentucky Crayfish	Malacostraca	Golconda	N	T	Yes	Reference
<i>Erimyzon sucetta</i>	Lake Chubsucker	Actinopterygii	Golconda	N	T	Yes	Reference
<i>Faxonius margorectus</i>	Livingston Crayfish	Malacostraca	Golconda	N	S	Yes	Reference
<i>Lanius ludovicianus</i>	Loggerhead Shrike	Aves	Golconda	N	S	Yes	Reference
<i>Menidia audens</i>	Mississippi Silverside	Actinopterygii	Golconda	N	T		Reference
<i>Lithobates areolatus circulosus</i>	Northern Crawfish Frog	Amphibia	Golconda	N	S	Yes	Reference
<i>Myotis septentrionalis</i>	Northern Long- Eared Bat	Mammalia	Golconda	T	E	Yes	Reference
<i>Pandion haliaetus</i>	Osprey	Aves	Golconda	N	S	Yes	Reference
<i>Lampsilis ovata</i>	Pocketbook	Bivalvia	Golconda	N	E	Yes	Reference
<i>Simpsonaias ambigua</i>	Salamander Mussel	Bivalvia	Golconda	N	T	Yes	Reference
<i>Passerculus sandwichensis</i>	Savannah Sparrow	Aves	Golconda	N	S	Yes	Reference
<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron	Aves	Golconda	N	T	Yes	Reference

27 species are listed.

Appendix C

Photographic Record

Photo Number:

1.

4/10/2023

Description:

Representative photo of the western forested area.



Photo Number:

2.

4/10/2023

Description:

Representative photo of the western forested area with downed trees.



Photo Number:

3.

4/11/2023

Description:

Representative photo of
downed trees in the
northwestern forested area.



Photo Number:

4.

4/12/2023

Description:

Photo of shagbark hickory
(*Carya ovata*) in the northern
forested area.



Photo Number:

5.

4/12/2023

Description:

Representative photo of the southern forested area.



Photo Number:

6.

4/12/2023

Description:

Representative photo of the western forested area with downed trees.



Photo Number:

7.

4/12/2023

Description:

Representative photo of forest edge, potential Price's potato bean habitat.



Photo Number:

8.

4/12/2023

Description:

Representative photo of pasture that covers most of the project area.



Photo Number:

9.

4/12/2023

Description:

Representative photo of
forested wetland in the
western forested area.



Photo Number:

10.

4/12/2023

Description:

Representative photo of
forested wetland in the
northern forested area.



Photo Number:

11.

4/13/2023

Description:

Photo of Barn 1.



Photo Number:

12.

4/13/2023

Description:

Photo of Barn 2.



Photo Number:

13.

4/13/2023

Description:

Photo of barn 3 with silo.



Photo Number:

14.

4/13/2023

Description:

Photo of the off-site church.

