



Juliet Solar

Exhibit E

Ecological Assessment

Part 3 of 4

Case No. 20-1760-EL-BGN

Juliet Solar Project

APPENDIX

B

AGENCY CORRESPONDENCE

From: Ohio, FW3 <ohio@fws.gov>

Sent: Friday, November 20, 2020 9:25 AM

To: Angie Morrow <Angie.Morrow@cardno.com>

Cc: mretterer@pheasantsforever.org; Stevenson, Lori <lori_stevenson@fws.gov>; nathan.reardon@dnr.state.oh.us; Parsons, Kate <kate.parsons@dnr.state.oh.us>

Subject: Juliet Solar Energy Project in Wood County, Ohio



UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
Ecological Services Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / Fax (614) 416-8994



TAILS# 03E15000-2021-TA-0343

Dear Ms. Morrow,

The U.S Fish and Wildlife Service (Service) has received your recent correspondence requesting information about the subject proposal. We offer the following comments and recommendations to assist you in minimizing and avoiding adverse impacts to threatened and endangered species pursuant to the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq), as amended (ESA).

Federally Threatened and Endangered Species: The endangered Indiana bat (*Myotis sodalis*) and threatened northern long-eared bat (*Myotis septentrionalis*) occur throughout the State of Ohio. The Indiana bat and northern long-eared bat may be found wherever suitable habitat occurs unless a presence/absence survey has been performed to document absence. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and breed that may also include adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, woodlots, fallow fields, and pastures. Roost trees for both species include live and standing dead trees ≥ 3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities. These roost trees may be located in forested habitats as well as linear features such as fencerows, riparian forests, and other wooded corridors. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. In the winter, Indiana bats and northern long-eared bats hibernate in caves, rock crevices and abandoned mines.

Seasonal Tree Clearing for Federally Listed Bat Species: Should the proposed project site contain trees ≥ 3 inches dbh, we recommend avoiding tree removal wherever possible. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring portal surveys are warranted. If no caves or abandoned mines are present and trees ≥ 3 inches dbh cannot be avoided, we recommend removal of any trees ≥ 3 inches dbh only occur between October 1 and March 31. Seasonal clearing is recommended to avoid adverse effects to Indiana bats and northern long-eared bats. While incidental take of

northern long-eared bats from most tree clearing is exempted by a 4(d) rule (see <http://www.fws.gov/midwest/endangered/mammals/nleb/index.html>), incidental take of Indiana bats is still prohibited without a project-specific exemption. Thus, seasonal clearing is recommended where Indiana bats are assumed present.

If implementation of this seasonal tree cutting recommendation is not possible, a summer presence/absence survey may be conducted for Indiana bats. If Indiana bats are not detected during the survey, then tree clearing may occur at any time of the year. Surveys must be conducted by an approved surveyor and be designed and conducted in coordination with the Ohio Field Office. Surveyors must have a valid federal permit. Please note that in Ohio summer mist net surveys may only be conducted between June 1 and August 15.

POLLINATOR COMMENTS:

The Service is working closely with our partners at Ohio Pollinator Habitat Initiative (OPHI) to create and enhance pollinator habitat at solar power installations. Attached for your use is the Ohio Solar Site Pollinator Habitat Planning and Assessment Form. This form was developed by the OPHI Solar Pollinator Program Advisory Team. We recommend that the areas between the solar panels be planted with legumes and wildflowers (i.e. forbs) that are beneficial to pollinators and other wildlife instead of non-native grass. Pollinators are beneficial to agricultural communities like the project area because they pollinate many varieties of fruits and vegetables. The recommended legumes and forbs are short (low-growing) so as not to cast shadows on the solar panels and would only require one to two mowings a year for maintenance, which should allow the project proponent to minimize maintenance costs. For other areas of the installation where vegetation does not have to be low-growing, alternative pollinator mixes are available with a more diverse array of flowering plants. This perennial vegetation will provide beneficial foraging habitat to songbirds and pollinators (e.g., monarch butterfly and the federally listed rusty patched bumblebee) while reducing storm water runoff, standing water, and erosion. Native plants can act as host plants for insect larva while flowering plants provide nectar sources for adult butterflies as well as other pollinators such as hummingbirds. Seeds from these plants can also provide food for a wide variety of bird species. Please contact the Ohio Pollinator Habitat Initiative (<http://www.ophi.info/>, and specifically Mike Retterer mretterer@pheasantsforever.org) [for](#) further information on solar power facility pollinator plantings.

Recommended low-growing grasses and forbs may include:

| | |
|--------------------|--------------------------------|
| Little Bluestem | <i>Schizachyrium scoparium</i> |
| Sideoats Grama | <i>Bouteloua curtipendula</i> |
| Alfalfa | <i>Medicago spp.</i> |
| Alsike Clover | <i>Trifolium hybridum</i> |
| Brown-eyed Susan | <i>Rudbeckia triloba</i> |
| Butterfly Milkweed | <i>Asclepias tuberosa</i> |

| | |
|------------------------|---------------------------------|
| Lanceleaf Coreopsis | <i>Coreopsis lanceolata</i> |
| Partridge Pea | <i>Chamaecrista fasciculata</i> |
| Timothy | <i>Phleum pratense</i> |
| Orchardgrass | <i>Dactylis glomerata</i> |
| Crimson Clover | <i>Trifolium incarnatum</i> |
| Ladino or White Clover | <i>Trifolium repens</i> |

Section 7 Coordination: If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), then no tree clearing should occur on any portion of the project area until consultation under section 7 of the ESA, between the Service and the federal action agency, is completed. We recommend the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence. This letter provides technical assistance only and does not serve as a completed section 7 consultation document.


Stream and Wetland Avoidance: Over 90% of the wetlands in Ohio have been drained, filled, or modified by human activities, thus is it important to conserve the functions and values of the remaining wetlands in Ohio (https://epa.ohio.gov/portals/47/facts/ohio_wetlands.pdf). We recommend avoiding and minimizing project impacts to all wetland habitats (e.g., forests, streams, vernal pools) to the maximum extent possible in order to benefit water quality and fish and wildlife habitat. Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the U.S. Army Corps of Engineers should be contacted to determine whether a Clean Water Act section 404 permit is required. Best management practices should be used to minimize erosion, especially on slopes. Disturbed areas should be mulched and revegetated with native plant species. In addition, prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats.

Due to the project type, size, and location, we do not anticipate adverse effects to any other federally endangered, threatened, or proposed species, or proposed or designated critical habitat. Should the project design change, or additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, coordination with the Service should be initiated to assess any potential impacts.

Thank you for your efforts to conserve listed species and sensitive habitats in Ohio. We recommend coordinating with the Ohio Department of Natural Resources due to the potential for the proposed project to affect state listed species and/or state lands. Contact Mike Pettegrew, Acting Environmental Services Administrator, at (614) 265-6387 or at mike.pettegrew@dnr.state.oh.us.

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or ohio@fws.gov.

Sincerely,



Patrice M. Ashfield
Field Office Supervisor

cc: Nathan Reardon, ODNR-DOW
Kate Parsons, ODNR-DOW
Lori Stevenson, FWS Partners Program
Mike Retterer, OPHI - Pheasants Forever



Ohio Department of Natural Resources

MIKE DEWINE, GOVERNOR

MARY MERTZ, DIRECTOR

Office of Real Estate

John Kessler, Chief

2045 Morse Road – Bldg. E-2

Columbus, OH 43229

Phone: (614) 265-6621

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January 11, 2021

Angie Morrow
Cardno
121 Continental Drive, Suite 308
Newark, Delaware 19713

Re: 20-1048; 7X Energy's Proposed Juliet Solar Energy Project

Project: The proposed project involves constructing a solar facility on approximately 671 acres.

Location: The proposed project is located near Weston, Wood County, Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Natural Heritage Database: The Natural Heritage Database has no records at or within a one-mile radius of the project area.

A review of the Ohio Natural Heritage Database indicates there are no other records of state endangered or threatened plants or animals within the project area. There are also no records of state potentially threatened plants, special interest or species of concern animals, or any federally listed species. In addition, we are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, state nature preserves, state or national parks, state or national forests, national wildlife refuges, or other protected natural areas within the project area. The review was performed on the project area you specified in your request as well as an additional one-mile radius. Records searched date from 1980.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to streams, wetlands and other water resources be avoided and minimized to the fullest extent possible, and that best management practices be utilized to minimize erosion and sedimentation.

The Division of Wildlife is working closely with our partners at Ohio Pollinator Habitat Initiative (OPHI) to create and enhance pollinator habitat at solar power installations. Attached for your use is the Ohio Solar Site Pollinator Habitat Planning and Assessment Form. This form was developed by the OPHI Solar Pollinator Program Advisory Team. We recommend that the areas between and around the solar panels be planted with legumes and wildflowers (i.e. forbs) that are beneficial to pollinators and other wildlife and reduce use of non-native grass and gravel. The recommended legumes and forbs listed below are low-growing so as not to cast shadows on the solar panels and would only require one to two mowings a year for maintenance, which should minimize maintenance costs. For other areas of the installation where vegetation does not have to be low-growing, alternative pollinator mixes are available with a more diverse array of flowering plants. This perennial vegetation will provide beneficial foraging habitat to songbirds and pollinators while reducing storm water runoff, standing water, and erosion. Please contact the Ohio Pollinator Habitat Initiative <http://www.ophi.info/>, and specifically Mike Retterer mretterer@pheasantsforever.org for further information on solar power facility pollinator plantings.

Recommended low-growing grasses and forbs may include:

| | |
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| Lanceleaf Coreopsis | <i>Coreopsis lanceolata</i> |
| Partridge Pea | <i>Chamaecrista fasciculata</i> |
| Timothy | <i>Phleum pratense</i> |
| Orchardgrass | <i>Dactylis glomerata</i> |
| Crimson Clover | <i>Trifolium incarnatum</i> |
| Ladino or White Clover | <i>Trifolium repens</i> |

The entire state of Ohio is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species, the northern long-eared bat (*Myotis septentrionalis*), a state endangered and federally threatened species, the little brown bat (*Myotis lucifugus*), a state endangered species, and the tricolored bat (*Perimyotis subflavus*), a state endangered species. During the spring and summer (April 1 through September 30), these species of bats predominately roost in trees behind loose, exfoliating bark, in crevices and cavities, or in the leaves. However, these species are also dependent on the forest structure surrounding roost trees. If trees are present within the project area, and trees must be cut, the DOW recommends cutting only occur from October 1 through March 31, conserving trees with loose, shaggy bark and/or crevices, holes, or cavities, as well as trees with DBH ≥ 20 if possible. If trees are present within the project area, and trees must be cut during the summer months, the DOW recommends a mist net survey or acoustic survey be conducted from June 1 through August 15, prior to any cutting. Mist net and acoustic surveys should be conducted in accordance with the most recent version of the “OHIO DIVISION OF WILDLIFE GUIDANCE FOR BAT SURVEYS AND TREE CLEARING”. If state listed bats are documented, DOW recommends cutting only occur from October 1 through March 31, however, limited summer tree cutting may be acceptable after consultation with DOW (contact Sarah Stankavich, sarah.stankavich@dnr.state.oh.us).

The DOW also recommends that a desktop habitat assessment, followed by a field assessment if needed, is conducted to determine if there are potential hibernaculum(a) present within the project

area. Information about how to conduct habitat assessments can be found in the current USFWS “Range-wide Indiana Bat Survey Guidelines.” If a habitat assessment finds that potential hibernacula are present within 0.25 miles of the project area, please send this information to Sarah Stankavich, sarah.stankavich@dnr.state.oh.us for project recommendations. If a potential or known hibernaculum is found, the DOW recommends a 0.25-mile tree cutting and subsurface disturbance buffer around the hibernaculum entrance, however, limited summer or winter tree cutting may be acceptable after consultation with DOW. If no tree cutting or subsurface impacts to a hibernaculum are proposed, this project is not likely to impact these species.

The project is within the range of the pondhorn (*Uniomerus tetralasmus*), a state threatened mussel. This project must not have an impact on freshwater native mussels at the project site. This applies to both listed and non-listed species. Per the Ohio Mussel Survey Protocol (2020), all Group 2, 3, and 4 streams (Appendix A) require a mussel survey. Per the Ohio Mussel Survey Protocol, Group 1 streams (Appendix A) and unlisted streams with a watershed of 5 square miles or larger above the point of impact should be assessed using the Reconnaissance Survey for Unionid Mussels (Appendix B) to determine if mussels are present. Mussel surveys may be recommended for these streams as well. This is further explained within the Ohio Mussel Survey Protocol. Therefore, if in-water work is planned in any stream that meets any of the above criteria, the DOW recommends the applicant provide information to indicate no mussel impacts will occur. If this is not possible, the DOW recommends a professional malacologist conduct a mussel survey in the project area. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the project site. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol. The Ohio Mussel Survey Protocol (2020) can be found at:

<http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/licenses%20&%20permits/OH%20Mussel%20Survey%20Protocol.pdf>

The project is within the range of the western banded killifish (*Fundulus diaphanatus menona*), a state endangered fish, and the greater redhorse (*Moxostoma valenciennesi*), a state threatened fish. The DOW recommends no in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed in a perennial stream, this project is not likely to impact these or other aquatic species.

The project is within the range of the Kirtland’s snake (*Clonophis kirtlandii*), a state threatened species. This secretive species prefers wet meadows and other wetlands. Due to the location, the type of habitat within the project area, and the type of work proposed, this project is not likely to impact this species.

The project is within the range of the spotted turtle (*Clemmys guttata*), a state threatened species. This species prefers fens, bogs and marshes, but also is known to inhabit wet prairies, meadows, pond edges, wet woods, and the shallow sluggish waters of small streams and ditches. Due to the location, the type of habitat within the project area, and the type of work proposed, this project is not likely to impact this species.

The project is within the range of the common tern (*Sterna hirundo*), a state endangered bird. The preferred nesting sites of common terns are natural or man-made islands that are free of mammalian predators and human disturbance. They will also utilize mainland beaches and dredge disposal areas but only when islands are unavailable. The common tern nests in colonies. Their eggs are laid in a grass-lined depression in the sand. If this type of habitat will be impacted, construction should be avoided in this habitat during the species’ nesting period of May 1 to August 1. If no wetland habitat will be impacted, the project is not likely to impact this species.

The project is within the range of the lark sparrow (*Chondestes grammacus*), a state endangered bird. This sparrow nests in grassland habitats with scattered shrub layers, disturbed open areas, as well as patches of bare soil. These summer residents normally migrate out of Ohio shortly after their young fledge or leave the nest. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 1 to June 30. If this habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the least bittern (*Ixobrychus exilis*), a state threatened bird. This secretive marsh species prefers dense emergent wetlands with thick stands of cattails, sedges, sawgrass or other semiaquatic vegetation interspersed with woody vegetation and open water. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 1 to July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the loggerhead shrike (*Lanius ludovicianus*), a state endangered bird. The loggerhead shrike nests in hedgerows, thickets and fencerows. They hunt over hayfields, pastures, and other grasslands. If thickets or other types of dense shrubby habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 1 to August 1. If this habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the northern harrier (*Circus hudsonis*), a state endangered bird. This is a common migrant and winter species. Nesters are much rarer, although they occasionally breed in large marshes and grasslands. Harriers often nest in loose colonies. The female builds a nest out of sticks on the ground, often on top of a mound. Harriers hunt over grasslands. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 15 to August 1. If this habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the trumpeter swan (*Cygnus buccinator*), a state threatened bird. Trumpeter swans prefer large marshes and lakes ranging in size from 40 to 150 acres. They like shallow wetlands one to three feet deep with a diverse mix of plenty of emergent and submergent vegetation and open water. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 15 to June 15. If this habitat will not be impacted, this project is not likely to have an impact on this species.

The project is within the range of the upland sandpiper (*Bartramia longicauda*), a state endangered bird. Nesting upland sandpipers utilize dry grasslands including native grasslands, seeded grasslands, grazed and ungrazed pasture, hayfields, and grasslands established through the Conservation Reserve Program (CRP). If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 15 to July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

Due to the potential of impacts to federally listed species, as well as to state listed species, we recommend that this project be coordinated with the U.S. Fish & Wildlife Service.

Geological Survey: The Division of Geological Survey has the following comments.

Physiographic Region

The proposed project area is in Weston and Milton townships, Wood County. This area is in the Maumee Sand Plains physiographic region. This region is characterized by lacustrine plain mantled by sand. Low dunes, inter-dunal pans, beach ridges and sand sheets are present as remains of glacial lakeshores. Soils range from well to poorly drained. Late Wisconsinan-aged

sand covers clay till and lacustrine deposits. Silurian and Devonian-age bedrock are deeply buried (Ohio Department of Natural Resources, Division of Geological Survey, 1998).

Surficial/Glacial Geology

The project area lies within the glaciated margin of the state and includes several Wisconsin-aged glacial features. Most of the project area is covered by lacustrine and eolian sand deposits. This sand was deposited in glacial lakes as shallow-water deltas or nearshore sand bars and sheets and worked into dunes. These deposits may include areas of dunes. Both the southeast and the southwest corners of the project area are covered by lake-planed moraine features. These deposits feature a very flat terrain made up of clayey till with small patches of sand, silt or clay on the surface in many areas (Pavey et al, 1999). Glacial drift throughout most of the study area is between 49 and 72 feet thick. Drift is thinnest in the west and thickest in the east (Powers and Swinford, 2004).

Bedrock Geology

The uppermost bedrock unit in the project area is the Detroit River Group. This unit is Devonian-aged and consists of laminations, nodules or interbeds of anhydrite and gypsum. The basal part of this unit becomes sandy dolomite or fine-grained sandstone. This unit covers the southwest corner of the project area. Underlying the Detroit River Group is the Silurian-aged Salina Undifferentiated. This unit is characterized by a gray to brown dolomite which contains argillaceous partings, brecciated intervals, algal laminations and anhydrite/gypsum zones. This unit covers the remainder of the project area. It should be noted that bedrock is not exposed at the surface within the boundaries of the project area due to significant glacial drift (Slucher et al, 2006).

Oil, Gas and Mining

ODNR has record of one oil and gas well within one mile of the proposed project area. This well is listed as plugged and abandoned (Ohio Department of Natural Resources, Division of Oil and Gas, *Ohio Oil and Gas Wells Locator*).

ODNR does not have record of any mining operations within the project area. The nearest mine to the project is the Custar Stone quarry operated by The Custar Stone Company. This mine is a limestone quarry and is located approximately two miles from the site boundary (Ohio Department of Natural Resources, Division of Mineral Resources, *Mines of Ohio*).

Seismic Activity

Several small earthquakes have historically been recorded in Wood County, Ohio. The three events closest to the site are listed in the chart below (Ohio Department of Natural Resources, Division of Geological Survey, *Ohio Earthquake Epicenters*):

| Date | Magnitude | Distance to Site Boundary | County | Township |
|-----------------|-----------|---------------------------|--------|----------|
| July 4, 1992 | 2.0 | 12 miles | Wood | Henry |
| July 14, 1992 | 2.0 | 12.5 miles | Wood | Henry |
| October 4, 1992 | 2.5 | 16 miles | Wood | Webster |

Karst

Karst features usually form in areas that are covered by thin or no glacial drift and the bedrock is limestone or dolomite. The nearest known sinkholes to the project area are over 20 miles away in Sandusky County. However, it should be noted that the Salina Undifferentiated, which underlies the project area, has been known to produce karst features when conditions are right (Ohio Department of Natural Resources, Division of Geological Survey, *Ohio Karst*).

Soils

According to the USDA Web Soil Survey, the project area consists primarily of soils derived from eolian sands, glaciolacustrine deposits and till. Mermill, Hoytville, Wauseon and Rimer are the most common soil series found within the boundaries of the project area. Together these soils make up over 75% of the project area. Other notable soils include Ottokee, Colwood, Tedrow, Spinks and Seward (USDA Web Soil Survey).

There is a low to moderate risk of shrink-swell potential in these soils. Other limiting factors include ponding and seasonal saturation in some soils. Slope remains relatively flat, with slopes that do not exceed a 6% grade (USDA Web Soil Survey).

Groundwater

Groundwater resources are plentiful throughout the project area. Wells developed in bedrock are likely to yield up to 100 gallons per minute. Wells developed in the Salina Undifferentiated can expect yields of up to 100 gallons per minute, with yields beyond that expected in well-developed commercial wells. Wells developed in deeper Silurian carbonate units can expect a similar yield. Where present, the Detroit River Group has an expected yield of 0 to 5 gallons per minute, however drillers typically will drill through the Detroit River Group to the much higher yielding units below (Ohio Department of Natural Resources, Division of Water, *Bedrock Aquifer Map*, 2000). Wells developed in glacial material are likely to yield up to 25 gallons per minute. The Lake Maumee Lacustrine Aquifer covers much of the project area and has a yield of less than 5 gallons per minute. The Lake Maumee Beach Ridge Aquifer intersects the project area from the east and has a yield of 5 to 25 gallons per minute. Higher groundwater yields typically reflect larger diameter, properly developed and screened wells (Ohio Department of Natural Resources, Division of Water, *Statewide Unconsolidated Aquifer Map*, 2000).

ODNR has record of 66 water wells drilled within one mile of the project area. These wells range in depth from 14 to 236 feet deep, with an average depth of 81.2 feet. The most common aquifer listed is limestone. Three wells list sand as the aquifer, four list silt and clay, one well lists hardpan, the remaining wells all list limestone as the aquifer. A sustainable yield of 4 to 60 gallons per minute is expected from wells drilled in this area based on well log records. The average sustainable yield was 20.1 gallons per minute. This is based on records from 21 wells within one mile of the project area that contain sustainable yield data (Ohio Department of Natural Resources, Division of Water, *Ohio Water Wells*).

Water Resources: The Division of Water Resources has the following comment.

The local floodplain administrator should be contacted concerning the possible need for any floodplain permits or approvals for this project. Your local floodplain administrator contact information can be found at the website below.

http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List_8_16.pdf

ODNR appreciates the opportunity to provide these comments. Please contact Sarah Tebbe, Environmental Specialist, at Sarah.Tebbe@dnr.ohio.gov if you have questions about these comments or need additional information.

Mike Pettegrew
Environmental Services Administrator (Acting)

References

- Ohio Department of Natural Resources, Division of Geological Survey, *Ohio Earthquake Epicenters*, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=earthquakes>
- Ohio Department of Natural Resources, Division of Geological Survey, *Ohio Karst*, online interactive map, https://gis.ohiodnr.gov/website/dgs/karst_interactivemap/
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- Ohio Department of Natural Resources, Division of Mineral Resources, *Mines of Ohio*, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=OhioMines>.
- Ohio Department of Natural Resources, Division of Oil and Gas, *Ohio Oil and Gas Wells Locator*, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=oilgaswells>.
- Ohio Department of Natural Resources, Division of Water, *Ohio Water Wells*, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=waterwells>.
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- Powers, D.M., and Swinford, E.M. (2004). *Shaded drift-thickness map of Ohio*, Ohio Department of Natural Resources, Division of Geological Survey, map, scale 1:500,000
- Slucher, E., Swinford, E., Larsen, G., Schumacher, G., Shrake, D., Rice, C., Caudill, M., Rea, R. and Powers, D. (2006). *Bedrock Geologic Map of Ohio*, Ohio Department of Natural Resources, Division of Geological Survey, map, scale 1:500,000.
- USDA Web Soil Survey, (Last modified 2019). *Web Soil Survey Interactive Map*, United States Department of Agriculture, National Resources Conservation Service, online interactive map, <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

Ohio Solar Site Pollinator Habitat Planning and Assessment Form

1. Percent of total site planted with native or beneficial introduced flowering plants.

| | |
|---------|-----------|
| 25-50% | 10 points |
| 51-75% | 20 points |
| 76-100% | 30 points |

2. Flowering plant diversity in site perimeter & buffer area (species with more than 1% cover).

| | |
|---|-----------|
| 9-12 species | 5 points |
| 13-16 species | 10 points |
| 17-20 species | 15 points |
| 20+ species | 20 points |
| Site specific Milkweed included @2,000 pls/ac minimum | 10 points |

* If no boxes were selected in questions 1 or 2 then your site does not meet criteria to be considered as an OPHI Solar Pollinator Habitat. However, OPHI can work with you on ways to increase the pollinator score of your site.

3. Flowering plant seed mixes and plantings to be used.

Native species local to the site are preferred; otherwise species native to Ohio are encouraged.

| | |
|---|-----------|
| Includes only native plant species | 15 points |
| Includes native and beneficial introduced plant species | 10 points |
| Includes only beneficial introduced plant species | 5 points |

4. Flowering plant diversity in rows & under solar array.

| | |
|---|-----------|
| 4-6 | 5 points |
| 7+ | 10 points |
| Site specific Milkweed included @2,000 pls/ac minimum | 10 points |

5. Seasons with at least 3 blooming species. Check all that apply.

| | |
|----------------------------|----------|
| Spring (April – May) | 5 points |
| Summer (June – August) | 5 points |
| Fall (September – October) | 5 points |

6. Available habitat components within ¼ mile of site.

Check all that apply.

| | |
|-------------------------------|----------|
| Native grasses | 2 points |
| Trees and shrubs | 2 points |
| Forest edge habitat | 2 points |
| Cavity nesting sites | 2 points |
| Clean perennial water sources | 2 points |

7. Planned vegetative buffers adjacent to the solar site. Check all that apply.

| | |
|--|-----------|
| Site has planned buffer adjacent to solar site | 5 points |
| Buffer is at least 30 feet wide as measured from array fencing or edge of flower plantings | 5 points |
| Buffer is at least 50 feet wide as measured from array fencing or edge of flower plantings | 10 points |
| Buffer includes flowering Shrubs/trees and other shrubs/trees that provide food for wildlife | 5 points |

8. Habitat site preparation prior to implementation.

| | |
|---|------------|
| Measures taken to control weeds and invasive species prior to seeding/planting. | 10 points |
| Appropriate soil preparation done to reduce erosion | |
| And enhance germination/growth | 5 points |
| None | -10 points |

9. Planned management practices for areas designated as part of the pollinator habitat site. Check all that apply.

| | |
|---|-----------|
| Detailed establishment and management plan developed for site | 10 points |
| Mowing Follows OPHI mowing schedule for monarchs each year | 5 points |
| Mowing is staggered over a 2 week period | 5 points |
| Signage indicating site is wildlife & pollinator-friendly | 5 points |
| Creation of habitat features (e.g. boxes, pass-through tunnels, bee hotels) | 5 points |
| Long-term monitoring plan developed that includes re-certification as Solar Site Pollinator Habitat | 10 points |

10. Insecticide risk. Check if applicable.

Communication with adjacent landowners about the project and possible impacts of their insecticide use is critical

| | |
|---|------------|
| Site is adjacent to land (within 120 ft.) where insecticides are used | -20 points |
| Planned on-site insecticide use (including pre-treated seeds/plants) | -40 points |

Total Points: _____

Provides High Quality Pollinator Habitat > 85
Meets OPHI Solar Pollinator Habitat Standards 70-84

Site Owner/Operator:

Project Location:

Project Size (acres):

Planned Source of Seeds:

Planned Seeding Date:

Habitat & Vegetation Consultant:

Refer to www.ophi.info for more information regarding solar pollinator habitat development.

Version 1 - March 2018

Developed by the OPHI Solar Pollinator Program Advisory Team





OHIO DIVISION OF WILDLIFE GUIDANCE FOR BAT SURVEYS AND TREE CLEARING JUNE 2020

Agency Contacts:

ODNR-DOW Permit Coordinator: Wildlife.Permits@dnr.state.oh.us, (614) 265-6315

ODNR-DOW Bat Survey Coordinator: Sarah Stankavich, sarah.stankavich@dnr.state.oh.us, (614) 265-6764

Due to the evolving situation with COVID-19, we are temporarily suspending bat-handling activities until more is known about the risk to North American bats. This document has been updated with new state guidance for the 2020 field season only, or until bat-handling activities are reinstated. These guidelines replace previous guidelines released in March 2020.

This guidance applies to state recommendations only. Contact the USFWS to determine if federal consultation is also necessary to comply with federal law.

Ohio Mist Net Surveys:

Mist-netting for presence/absence surveys, education events, or research activities will not be authorized for the 2020 season.

Ohio Acoustic Surveys:

Acoustic bat surveys for presence/absence will be accepted by ODNR for the 2020 season. Surveys should follow guidelines laid out in the USFWS Range-wide Indiana Bat Survey Guidelines (March 2020) with the following exceptions:

- Ohio survey dates are June 1 – August 15, 2020
- After conducting automated analyses using one or more of the currently available ‘approved’ acoustic bat ID programs¹, qualitative analysis (i.e., manual vetting) of any calls recorded from state-endangered species (*Myotis sodalis*, *M. septentrionalis*², *M. lucifugus*², and *Perimyotis subflavus*²) must be completed.
 - At a minimum, for each detector site/night a program considered presence of state-listed bats likely, review all files (including no IDs) from that site/night. If more than one acoustic bat ID program is used, qualitative analysis must also include a comparison of the results of each program by site and night.

During Field Season:

- **Prior to initiation of field work (a minimum of two weeks in advance)**, permittees must provide proposed survey plans to ODNR-DOW via e-mail. **Plans must be reviewed and approved by ODNR-DOW before ANY surveys take place.** Study plans must specify objectives, location details, dates of proposed work, and all other relevant details.

¹ <https://www.fws.gov/midwest/Endangered/mammals/inba/surveys/inbaAcousticSoftware.html>

² State listing as endangered effective July 1, 2020

After Field Season:

- By March 15, you must submit your final ODNR-DOW report(s) from the previous summer. You are not required to fill out the ODNR-DOW Wildlife Diversity Bat Excel Spreadsheet; instead, please forward your USFWS Midwestern US Spreadsheet (found here: <http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>) to the ODNR-DOW Bat Survey Coordinator and ODNR-DOW Permit Coordinator and include your state permit number along with an electronic copy of the project report. Electronic summaries emailed during the field season are NOT considered as full compliance of this reporting requirement.

Ohio Environmental Review Recommendations for projects involving disturbance near potential/known bat hibernacula (cliffs, caves, mines) or tree cutting:

Step 1: Coordinate with Ohio Division of Wildlife (DOW) regarding existing records for state-listed endangered bat summer and/or winter occurrence information.

If project site contains a known bat hibernaculum(a) –

- For state-listed endangered species other than the Indiana bat, a recommendation of 0.25-mile tree cutting buffer around all known entrances to protect existing conditions at the hibernaculum(a). If the project involves subsurface disturbance, consultation with DOW is required.
- Limited summer and winter tree cutting may be permitted within the buffer following guidelines detailed below. Coordinate with DOW before cutting.

If a project site does not contain known bat hibernaculum(a)

- Conduct a habitat assessment (desktop or field-based, using methods detailed in current USFWS Range-wide Indiana Bat Guidelines) to determine if a potential hibernaculum(a) is present within the action area.

Step 2: When conducted, a presence/absence survey must follow current DOW guidelines.

Step 3: If a state-listed endangered bat is captured or recorded during the survey:

- Recommendation of no summer tree cutting, or limited cutting following guidelines detailed below, within 5 miles of the capture site if a roost is not located.
- Recommendation of no summer tree cutting, or limited cutting following guidelines detailed below, within 2.5 miles of a roost tree if located.

If no state-listed endangered bat is captured or recorded during the survey:

- Summer tree cutting may proceed for 5 years before a new survey is needed under state guidance.

Limited summer tree cutting guidance for bats that are only state-listed endangered: Limited tree cutting in summer may be permitted after consultation with DOW, but clearing trees with the following characteristics should be avoided unless they pose a hazard: dead or live trees of any size with loose, shaggy bark; crevices, holes, or cavities; live trees of any species with DBH \geq 20.

FREQUENTLY ASKED QUESTIONS

When does the Bat Survey protocol have to be used?

This protocol should be used anytime Indiana bat, northern long-eared bat, little brown bat, or tricolored bat summer presence/probable absence surveys are conducted in the state of Ohio. For 2020 only, acoustic surveys will meet the ODNR-DOW requirements unless new guidance allowing for the handling of bats during presence/absence surveys is released from USFWS.

How many net surveys are required for presence/probably absence?

As described in the current USFWS Range-wide Indiana Bat Guidelines: Linear projects: a minimum of 2 detector nights per km (0.6 miles) of suitable summer habitat

Non-linear projects: a minimum of 8 detector nights per 123 acres (0.5 km²) of suitable summer habitat. At least 2 detector locations per 123 acre "site" shall be sampled until at least 8 detector nights has been completed over the course of at least 2 calendar nights (may be consecutive). For example:

- 4 detectors for 2 nights each (can sample the same location or move within the site)
- 2 detectors for 4 nights each (can sample the same location or move within the site)
- 1 detector for 8 nights (must sample at least 2 locations and move within the site)

How long are the results of the surveys valid for an assessment of an area?

Mist-net or acoustic surveys documenting probable absence of state-listed endangered bats are valid for five years.

When can acoustic surveys occur in Ohio?

In Ohio, acoustic surveys may only be conducted from June 1 through August 15 unless indicated otherwise in your state permit. Any surveys outside of the June 1 - August 15 timeframe cannot be used in Ohio to assess the presence/probable absence of state-listed bats.

Can a presence/probable absence survey be conducted within a known Indiana bat and/or northern long-eared bat capture/detection buffer?

Surveys generally cannot be used to document presence/probable absence of state-listed endangered bats bat where presence of the species has already been confirmed by prior surveys.

What if a project is proposing to clear trees between April 1 and September 30 when bats may be present but no bat records exist in the project area?

Any Ohio project that is not within a known bat record buffer, and tree clearing between April 1 and September 31 is being proposed, may have a presence/absence survey conducted between June 1 and August 15 following the range-wide guidance. If a presence/absence survey is not performed, presence of listed bats is assumed.

How does take of northern long-eared bats differ from Indiana bats?

Under Ohio law, there is no exemption for take of any listed bat species.

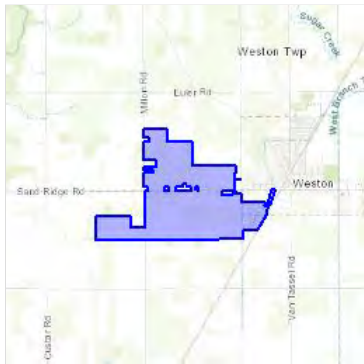
IPaC resource list

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.

Location

Wood County, Ohio



Local office

Ohio Ecological Services Field Office

☎ (614) 416-8993

📅 (614) 416-8994

4625 Morse Road, Suite 104
Columbus, OH 43230-8355

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. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. 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.
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 |
|--|------------|
| <div>Indiana Bat <i>Myotis sodalis</i></div> <div>There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5949</div> | Endangered |
| <div>Northern Long-eared Bat <i>Myotis septentrionalis</i></div> <div>This species only needs to be considered if the following condition applies:<ul style="list-style-type: none">Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at https://www.fws.gov/midwest/endangered/mammals/nleb/s7.htmlNo critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045</div> | 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.

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 <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.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 (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.) |
|---|--|
| 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. https://ecos.fws.gov/ecp/species/1626 | Breeds Dec 1 to Aug 31 |
| Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 20 to Jul 31 |
| Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679 | Breeds elsewhere |
| Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 10 to Sep 10 |
| Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds elsewhere |
| Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds elsewhere |
| Willow Flycatcher <i>Empidonax traillii</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482 | Breeds May 20 to Aug 31 |
| Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 10 to Aug 31 |

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 $0.05/0.25 = 0.2$.
3. 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](#) and/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 migratory birds potentially occurring 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 [AKN Phenology 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, migrating or present year-round in my project 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 refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). 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

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 POND

[PUBGx](#)

RIVERINE

[R4SBC](#)

[R5UBH](#)

[R5UBFx](#)

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

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.



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Services

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Ohio County Distribution of Federally-Listed Endangered, Threatened, and Proposed Species

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For more information about threatened and endangered species in Ohio, contact the [U.S. Fish & Wildlife Service office at 4625 Morse Road, Suite 104 Columbus, Ohio 43230 \(614-416-8993\)](#)

What We Do

Midwest Endangered
Species

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Glossary

Bald Eagle

Bald eagles are no longer protected under the federal Endangered Species Act and Section 7 consultation with the U.S. Fish and Wildlife Service is no longer necessary. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act.

[Information about Bald Eagles](#)

[Information about Eagle Permits and the Bald and Golden Eagle Protection Act](#)

Revised January 29, 2018

| County | Species | Status | Habitat |
|--------|--|------------|---|
| Adams | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearly mussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |


Listed Plants and
Animals

Featured Species

All Midwest Listed Species

State and County Lists

Species of Concern

| | | | | |
|--|------------------|---|------------|---|
| <p>Extinct Species</p> <hr/> <p>Fact Sheets</p> | | Snuffbox <i>(Epioblasma triquetra)</i> | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | | Running buffalo clover <i>(Trifolium stoloniferum)</i> | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| <p>Endangered Species Program</p> <p><i>The mission of the U.S. Fish and Wildlife Service's Endangered Species program is conserving and restoring threatened and endangered species and their ecosystems.</i></p> <p>U.S. Fish and Wildlife Service in the Midwest</p>  <p><i>The Midwest Region includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin.</i></p> <p>Find a location near you »</p> | Allen | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Ashland | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Ashtabula | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | | Kirtland's warbler <i>(Dendroica kirtlandii)</i> | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | | Piping plover <i>(Charadrius melodus)</i> | Endangered | Beaches along shorelines of the Great Lakes |
| | | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| | | | Threatened | Wetlands and adjacent uplands |

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| | Eastern massasauga (<i>Sistrurus catenatus</i>) | | |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Athens | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | American burying beetle (<i>Nicrophorus americanus</i>) | Endangered | |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Auglaize | Indiana bat | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Belmont | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; |

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| | | | Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Brown | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Butler | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |

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| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Carroll | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Champaign | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Clark | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | |

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| | | | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>) | Threatened | Mesic to wet prairies and meadows |
| Clermont | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Clinton | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Columbiana | | Endangered | |

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| | Indiana bat (<i>Myotis sodalis</i>) | | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Coshocton | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Purple cat's paw pearlymussel (<i>Endangeredpioblasma obliquata obliquata</i>) | Endangered | Gravel riffles of medium to large rivers |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Threatened | |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Critical Habitat | Walhonding River Map of Critical Habitat |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Crawford | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; |

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| | | | Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Cuyahoga | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Kirtland's warbler (<i>Dendroica kirtlandii</i>) | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | Piping plover (<i>Charadrius melodus</i>) | Endangered | Beaches along shorelines of the Great Lakes |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| Darke | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Defiance | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with |

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| | | | well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Copperbelly water snake <i>(Nerodia erythrogaster neglecta)</i> | Threatened | Wooded and permanently wet areas such as oxbows, sloughs, brushy ditches and floodplain woods |
| | Clubshell <i>(Pleurobema clava)</i> | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell <i>(Epioblasma torulosa rangiana)</i> | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rayed bean <i>(Villosa fabalis)</i> | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | White cat's paw pearlymussel <i>(Epioblasma obliquata perobliqua)</i> | Endangered | Firm sand or gravel riffles in small streams and medium to large rivers |
| Delaware | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Threatened | |
| | Rayed bean <i>(Villosa fabalis)</i> | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox <i>(Epioblasma triquetra)</i> | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover <i>(Trifolium stoloniferum)</i> | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Erie | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; |

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| | | | Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Kirtland's warbler <i>(Dendroica kirtlandii)</i> | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | Eastern massasauga <i>(Sistrurus catenatus)</i> | Threatened | Wetlands and adjacent uplands |
| | Lakeside daisy <i>(Hymenoxys herbacea)</i> (Formerly <i>H. acaulis</i>) <i>var. glabra</i> | Threatened | Dry rocky prairies; limestone rock surfaces including outcrops and quarries |
| | Piping plover <i>(Charadrius melodus)</i> | Endangered | Beaches along shorelines of the Great Lakes |
| | Piping plover <i>(Charadrius melodus)</i> | Critical Habitat Designated | |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| Fairfield | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga <i>(Sistrurus catenatus)</i> | Threatened | Wetlands and adjacent uplands |
| | Running buffalo clover <i>(Trifolium stoloniferum)</i> | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Fayette | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
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| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Franklin | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Scioto madtom (<i>Noturus trautmani</i>) | Endangered | Stream riffles of moderate flow over sandy gravel bottom |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Threatened | |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Fulton | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | | Endangered | |

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| | Rayed bean (<i>Villosa fabalis</i>) | | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Gallia | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Geauga | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Greene | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer |

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| | | | roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Guernsey | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Hamilton | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |

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| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Hancock | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Hardin | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Copperbelly water snake (<i>Nerodia erythrogaster neglecta</i>) | Threatened | Wooded and permanently wet areas such as oxbows, sloughs, brushy ditches and floodplain woods |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Harrison | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat | Threatened | Hibernates in caves and mines - swarming in surrounding |

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| | <i>Myotis septentrionalis</i> | | wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Henry | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Highland | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Hocking | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Northern monkshood (<i>Aconitum noveboracense</i>) | Threatened | Cool, moist, shaded cliff faces or talus slopes in wooded ravines, near water seeps |
| | American burying beetle (<i>Nicrophorus americanus</i>) | Endangered | |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| | Small whorled pogonia (<i>Isotria medeoloides</i>) | Threatened | |

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| | | | Dry woodland; upland sites in mixed forests (second or third growth stage) |
| Holmes | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>) | Threatened | Mesic to wet prairies and meadows |
| Huron | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Jackson | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Jefferson | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with |

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| | | | well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Knox | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Lake | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Kirtland's warbler (<i>Dendroica kirtlandii</i>) | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | Piping plover (<i>Charadrius melodus</i>) | Endangered | Beaches along shorelines of the Great Lakes |
| | Piping plover (<i>Charadrius melodus</i>) | Critical Habitat Designated | |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Lawrence | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; |

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| | | | Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Licking | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Logan | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |

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| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Lorain | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Kirtland's warbler (<i>Dendroica kirtlandii</i>) | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | Piping plover (<i>Charadrius melodus</i>) | Endangered | Beaches along shorelines of the Great Lakes |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| Lucas | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Kirtland's warbler (<i>Dendroica kirtlandii</i>) | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | Piping plover (<i>Charadrius melodus</i>) | Endangered | Beaches along shorelines of the Great Lakes |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | | Endangered | Pine barrens and oak savannas on sandy soils and containing |

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| | Karner blue butterfly (<i>Lycaeides melissa samuelis</i>) | | wild lupines (<i>Lupinus perennis</i>), the only known food plant of larvae. |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>) | Threatened | Mesic to wet prairies and meadows |
| Madison | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Scioto madtom (<i>Noturus trautmani</i>) | Endangered | Stream riffles of moderate flow over sandy gravel bottom |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Threatened | |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Critical Habitat | Little Darby Creek Map of Critical Habitat Unit |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Mahoning | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer |

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| | | | roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Marion | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Medina | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Meigs | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |

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| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Mercer | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Miami | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Monroe | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Montgomery | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with |

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| | | | well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Morgan | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | American burying beetle (<i>Nicrophorus americanus</i>) | Endangered | |
| Morrow | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat | Threatened | Hibernates in caves and mines - swarming in surrounding |

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| | <i>Myotis septentrionalis</i> | | wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Muskingum | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Fanshell</u> (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | <u>Rabbitsfoot</u> <i>Quadrula cylindrica cylindrica</i> | Threatened | Muskingum River |
| | <u>Sheepnose</u> (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | <u>Snuffbox</u> (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Noble | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Ottawa | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Kirtland's warbler</u> (<i>Dendroica kirtlandii</i>) | Endangered | Kirtland's warblers are known to migrate along the Lake Erie |

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| | | | shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | Piping plover (<i>Charadrius melodus</i>) | Endangered | Beaches along shorelines of the Great Lakes |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>) | Threatened | Mesic to wet prairies and meadows |
| | Lakeside daisy (<i>Hymenoxys herbacea</i>) (Formerly <i>H. acaulis</i>) <i>var. glabra</i>) | Threatened | Dry rocky prairies; limestone rock surfaces including outcrops and quarries |
| Paulding | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Perry | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | American burying beetle (<i>Nicrophorus americanus</i>) | Endangered | |
| Pickaway | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |

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| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Scioto madtom <i>(Noturus trautmani)</i> | Endangered | Stream riffles of moderate flow over sandy gravel bottom |
| | Clubshell <i>(Pleurobema clava)</i> | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell <i>(Epioblasma torulosa rangiana)</i> | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rabbitsfoot <i>(Quadrula cylindrica cylindrica)</i> | Threatened | |
| | Rayed bean <i>(Villosa fabalis)</i> | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox <i>(Epioblasma triquetra)</i> | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover <i>(Trifolium stoloniferum)</i> | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Pike | Indiana bat <i>(Myotis sodalis)</i> | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Clubshell <i>(Pleurobema clava)</i> | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell <i>(Epioblasma torulosa rangiana)</i> | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rayed bean <i>(Villosa fabalis)</i> | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Running buffalo clover <i>(Trifolium stoloniferum)</i> | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
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|-----------------|---|------------|---|
| Portage | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Eastern massasauga</u> (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | <u>Mitchell's satyr butterfly</u> (<i>Neonympha mitchellii mitchellii</i>) | Endangered | Fens; wetlands characterized by calcareous soils which are fed by carbonate-rich water from seeps and springs |
| | <u>Northern monkshood</u> (<i>Aconitum noveboracense</i>) | Threatened | Cool, moist, shaded cliff faces or talus slopes in wooded ravines, near water seeps |
| Preble | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Eastern massasauga</u> (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Putnam | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Richland | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. |

| | | | |
|-----------------|---|------------|---|
| | | | During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Ross | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Sandusky | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Kirtland's warbler (<i>Dendroica kirtlandii</i>) | Endangered | Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. |
| | | Endangered | |

| | | | |
|---------------|---|------------|---|
| | Piping plover (<i>Charadrius melodus</i>) | | Beaches along shorelines of the Great Lakes |
| | Red Knot (Rufa) <i>Calidris canutus rufa</i> | Threatened | Present in Ohio during spring and fall migration |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>) | Threatened | Mesic to wet prairies and meadows |
| Scioto | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Pink mucket (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| | Small whorled pogonia (<i>Isotria medeoloides</i>) | Threatened | Dry woodland; upland sites in mixed forests (second or third growth stage) |
| | Virginia spiraea (<i>Spiraea virginiana</i>) | Threatened | Streambanks and floodplains |
| Seneca | | Endangered | |

| | | | |
|--------|---|------------|---|
| | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Shelby | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Rayed bean</u> (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| Stark | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Eastern massasauga</u> (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| Summit | <u>Indiana bat</u> (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | <u>Northern long-eared bat</u> <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | <u>Eastern massasauga</u> (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |

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|-------------------|---|------------|---|
| | Northern monkshood (<i>Aconitum noveboracense</i>) | Threatened | Cool, moist, shaded cliff faces or talus slopes in wooded ravines, near water seeps |
| Trumbull | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| Tuscarawas | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Union | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Scioto madtom (<i>Noturus trautmani</i>) | Endangered | Stream riffles of moderate flow over sandy gravel bottom |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Threatened | |

| | | | |
|-----------------|---|------------------|---|
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Critical Habitat | Little Darby Creek Map of Critical Habitat Unit |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Van Wert | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Vinton | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | American burying beetle (<i>Nicrophorus americanus</i>) | Endangered | |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Warren | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |

| | | | |
|-------------------|---|------------|---|
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | Running buffalo clover (<i>Trifolium stoloniferum</i>) | Endangered | Disturbed bottomland meadows; disturbed sites that have shade during part of each day |
| Washington | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Fanshell (<i>Cyprogenia stegaria</i>) (= <i>C. irrorata</i>) | Endangered | Found in areas of packed sand and gravel at locations in a good current |
| | Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) | Endangered | The lower Ohio River and its larger tributaries |
| | Sheepnose (<i>Plethobasus cyphus</i>) | Endangered | Shallow areas in larger rivers and streams |
| | Snuffbox (<i>Epioblasma triquetra</i>) | Endangered | Small to medium-sized creeks and some larger rivers, in areas with a swift current |
| Wayne | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>) | Threatened | Mesic to wet prairies and meadows |
| Williams | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with |

| | | | |
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| | | | well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| | Copperbelly water snake (<i>Nerodia erythrogaster neglecta</i>) | Threatened | Wooded and permanently wet areas such as oxbows, sloughs, brushy ditches and floodplain woods |
| | Clubshell (<i>Pleurobema clava</i>) | Endangered | Found in coarse sand and gravel areas of runs and riffles within streams and small rivers |
| | Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) | Endangered | Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Threatened | Fish Creek |
| | Rabbitsfoot <i>Quadrula cylindrica cylindrica</i> | Critical Habitat | Fish Creek Map of Critical Habitat Unit |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |
| | White cat's paw pearlymussel (<i>Epioblasma obliquata perobliqua</i>) | Endangered | Firm sand or gravel riffles in small streams and medium to large rivers |
| Wood | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |
| Wyandot | Indiana bat (<i>Myotis sodalis</i>) | Endangered | Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests |
| | Northern long-eared bat <i>Myotis septentrionalis</i> | Threatened | Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. During late spring and summer roosts and forages in upland forests. |

| | | | |
|--|--|------------|---|
| | Eastern massasauga (<i>Sistrurus catenatus</i>) | Threatened | Wetlands and adjacent uplands |
| | Rayed bean (<i>Villosa fabalis</i>) | Endangered | Smaller, headwater creeks, but they are sometimes found in large rivers |

¹Rayed Bean - These counties have been included for the rayed bean based upon current and historical occurrence data. Since 2004, three extant rayed bean populations have been discovered in Ohio streams. Two of these three populations were thought to be extirpated prior to the discoveries and the third population was not known from historical data. Therefore, we feel it is prudent to make our list of counties where the rayed bean may be present reflective of a conservative approach to section 7 consultation under the Endangered Species Act. The rayed bean should be considered potential present in any county on our list where suitable habitat occurs.

[State and County Distributions](#)

[Section 7 Technical Assistance - Step 2](#)

[Midwest Endangered Species Home](#)

Juliet Solar Project

APPENDIX

C

RTE SPECIES INFORMATION

Wood County State Listed Animal Species

| Common Name | Scientific Name | Group | State Status | Federal Status |
|--------------------------|---------------------------|-----------|--------------------|----------------|
| Upland Sandpiper | Bartramia longicauda | Bird | Endangered | |
| Lark Sparrow | Chondestes grammacus | Bird | Endangered | |
| Northern Harrier | Circus hudsonius | Bird | Endangered | |
| Loggerhead Shrike | Lanius ludovicianus | Bird | Endangered | |
| Common Tern | Sterna hirundo | Bird | Endangered | |
| Western Banded Killifish | Fundulus diaphanus menona | Fish | Endangered | |
| Washboard | Megaloniaias nervosa | Mollusk | Endangered | |
| Trumpeter Swan | Cygnus buccinator | Bird | Threatened | |
| Least Bittern | Ixobrychus exilis | Bird | Threatened | |
| Greater Redhorse | Moxostoma valenciennesi | Fish | Threatened | |
| Northern Long-eared Bat | Myotis septentrionalis | Mammal | Threatened | Threatened |
| Black Sandshell | Ligumia recta | Mollusk | Threatened | |
| Threehorn Wartyback | Obliquaria reflexa | Mollusk | Threatened | |
| Fawnsfoot | Truncilla donaciformis | Mollusk | Threatened | |
| Pondhorn | Unio merus tetralasmus | Mollusk | Threatened | |
| Spotted Turtle | Clemmys guttata | Reptile | Threatened | |
| Kirtland's Snake | Clonophis kirtlandii | Reptile | Threatened | |
| Four-toed Salamander | Hemidactylium scutatum | Amphibian | Species of Concern | |
| Sharp-shinned Hawk | Accipiter striatus | Bird | Species of Concern | |
| Henslow's Sparrow | Ammodramus henslowii | Bird | Species of Concern | |



| Common Name | Scientific Name | Group | State Status | Federal Status |
|-----------------------|-----------------------------------|---------|--------------------|----------------|
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | Bird | Species of Concern | |
| Great Egret | <i>Ardea alba</i> | Bird | Species of Concern | |
| Common Nighthawk | <i>Chordeiles minor</i> | Bird | Species of Concern | |
| Sedge Wren | <i>Cistothorus platensis</i> | Bird | Species of Concern | |
| Black-billed Cuckoo | <i>Coccyzus erythrophthalmus</i> | Bird | Species of Concern | |
| Northern Bobwhite | <i>Colinus virginianus</i> | Bird | Species of Concern | |
| Bobolink | <i>Dolichonyx oryzivorus</i> | Bird | Species of Concern | |
| American Coot | <i>Fulica americana</i> | Bird | Species of Concern | |
| Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> | Bird | Species of Concern | |
| Vesper Sparrow | <i>Pooecetes gramineus</i> | Bird | Species of Concern | |
| Sora Rail | <i>Porzana carolina</i> | Bird | Species of Concern | |
| Prothonotary Warbler | <i>Protonotaria citrea</i> | Bird | Species of Concern | |
| Virginia Rail | <i>Rallus limicola</i> | Bird | Species of Concern | |
| Cerulean Warbler | <i>Setophaga cerulea</i> | Bird | Species of Concern | |
| Muskellunge | <i>Esox masquinongy</i> | Fish | Species of Concern | |
| Star-nosed Mole | <i>Condylura cristata</i> | Mammal | Species of Concern | |
| Big Brown Bat | <i>Eptesicus fuscus</i> | Mammal | Species of Concern | |
| Red Bat | <i>Lasiurus borealis</i> | Mammal | Species of Concern | |
| Little Brown Bat | <i>Myotis lucifugus</i> | Mammal | Species of Concern | |
| Deer Mouse | <i>Peromyscus maniculatus</i> | Mammal | Species of Concern | |
| Badger | <i>Taxidea taxus</i> | Mammal | Species of Concern | |
| Purple Wartyback | <i>Cyclonaias tuberculata</i> | Mollusk | Species of Concern | |



| Common Name | Scientific Name | Group | State Status | Federal Status |
|-----------------------|-------------------------------------|---------|--------------------|----------------|
| Creek Heelsplitter | Lasmigona compressa | Mollusk | Species of Concern | |
| Round Pigtoe | Pleurobema sintoxia | Mollusk | Species of Concern | |
| Kidneyshell | Ptychobranhus fasciolaris | Mollusk | Species of Concern | |
| Deertoe | Truncilla truncata | Mollusk | Species of Concern | |
| Green-winged Teal | Anas crecca | Bird | Special Interest | |
| American Black Duck | Anas rubripes | Bird | Special Interest | |
| Veery | Catharus fuscescens | Bird | Special Interest | |
| Least Flycatcher | Empidonax minimus | Bird | Special Interest | |
| Wilson's Snipe | Gallinago delicata | Bird | Special Interest | |
| Dark-eyed Junco | Junco hyemalis | Bird | Special Interest | |
| Red-breasted Nuthatch | Sitta canadensis | Bird | Special Interest | |
| Western Meadowlark | Sturnella neglecta | Bird | Special Interest | |
| Blacknose Shiner | Notropis heterolepis | Fish | Extirpated | |
| Mucket | Actinonaias ligamentina ligamentina | Mollusk | Extirpated | |





Wood County

| Scientific Name | Common Name | Last Observed | State Status | Federal Status |
|--|------------------------------------|---------------|--------------|----------------|
| <i>Agalinis skinneriana</i> | Skinner's-foxtail | 1993-09-02 | E | |
| <i>Amelanchier sanguinea</i> | Rock Serviceberry | 1987-05-20 | T | |
| <i>Androsace occidentalis</i> | Western Rock-jasmine | 2008-05-27 | E | |
| <i>Anemone cylindrica</i> | Prairie Thimbleweed | 1997-08-08 | T | |
| <i>Arabidopsis lyrata</i> | Lyre-leaved Rock Cress | 1968-05 | E | |
| <i>Arabis pycnocarpa</i> var. <i>adpressipilis</i> | Southern Hairy Rock Cress | 1981-05 | P | |
| <i>Aureolaria pedicularia</i> var. <i>ambigens</i> | Prairie Fern-leaved False Foxglove | 2002-10-03 | E | |
| <i>Carex atherodes</i> | Wheat Sedge | 2009-08-13 | P | |
| <i>Carex aurea</i> | Golden-fruited Sedge | 2009-06-16 | P | |
| <i>Carex bicknellii</i> | Bicknell's Sedge | 1970-06-04 | T | |
| <i>Carex conoidea</i> | Field Sedge | 2010-05-25 | T | |
| <i>Carex crus-corvi</i> | Raven-foot Sedge | 1969-09 | T | |
| <i>Carex formosa</i> | Handsome Sedge | 1958-06-10 | E | |
| <i>Comptonia peregrina</i> | Sweet-fern | 1962-07-18 | E | |
| <i>Conyza ramosissima</i> | Bushy Horseweed | 2009-07-06 | P | |
| <i>Descurainia pinnata</i> | Tansy Mustard | 1992-07-21 | T | |
| <i>Dichanthelium leibergii</i> | Leiberg's Panic Grass | 1993-09-02 | T | |
| <i>Eleocharis compressa</i> | Flat-stemmed Spike-rush | 1981-05-29 | P | |
| <i>Gentiana puberulenta</i> | Prairie Gentian | 2001 | E | |
| <i>Hedeoma hispida</i> | Rough Pennyroyal | 2000-05-24 | P | |
| <i>Helianthemum bicknellii</i> | Plains Frostweed | 1983-10-03 | P | |
| <i>Helianthemum canadense</i> | Canada Frostweed | 1996-06-06 | T | |
| <i>Hesperostipa spartea</i> | Porcupine Grass | 1987-06-03 | E | |
| <i>Hieracium umbellatum</i> | Canada Hawkweed | 1970-08-31 | T | |
| <i>Juncus Greenei</i> | Greene's Rush | 1991-09-19 | T | |
| <i>Krigia virginica</i> | Virginia Dwarf-dandelion | 1996-06-06 | T | |
| <i>Lechea minor</i> | Thyme-leaved Pinweed | 1969-08-26 | T | |
| <i>Lechea pulchella</i> | Leggett's Pinweed | 1996-09-09 | P | |
| <i>Lilium philadelphicum</i> | Wood Lily | 1970-06-22 | E | |
| <i>Lithospermum carolinense</i> | Plains Puccoon | 1996-06-06 | T | |
| <i>Lupinus perennis</i> | Wild Lupine | 2007-05-31 | P | |



Wood County

| Scientific Name | Common Name | Last Observed | State Status | Federal Status |
|--|------------------------------|---------------|--------------|----------------|
| <i>Moehringia lateriflora</i> | Grove Sandwort | 1997-08-08 | P | |
| <i>Monarda punctata</i> | Dotted Horsemint | 1997-10-09 | E | |
| <i>Opuntia humifusa</i> | Common Prickly Pear | 2008-05-27 | P | |
| <i>Poa saltuensis ssp. languida</i> | Weak Spear Grass | 1968-05-29 | P | |
| <i>Prenanthes racemosa</i> | Prairie Rattlesnake-root | 1969-09-20 | P | |
| <i>Prunus nigra</i> | Canada Plum | 2008-05-27 | E | |
| <i>Ranunculus fascicularis</i> | Early Buttercup | 1963-05 | T | |
| <i>Rosa blanda</i> | Smooth Rose | 2007-05-30 | P | |
| <i>Salix petiolaris</i> | Slender Willow | 1970-07-20 | T | |
| <i>Scleria pauciflora</i> | Few-flowered Nut-rush | 1969-08-26 | P | |
| <i>Scleria triglomerata</i> | Tall Nut-rush | 1970-06-04 | P | |
| <i>Solidago speciosa</i> | Showy Goldenrod | 1983-10-03 | P | |
| <i>Sphenopholis obtusata var. obtusata</i> | Prairie Wedge Grass | 1970-06-04 | T | |
| <i>Spiranthes magnicamporum</i> | Great Plains Ladies'-tresses | 1983-10-11 | P | |
| <i>Triphora trianthophora</i> | Three-birds Orchid | 2004-08-16 | P | |
| <i>Ulmus thomasii</i> | Rock Elm | 2007-09-20 | P | |
| <i>Vernonia fasciculata</i> | Prairie Ironweed | 1988-08-09 | E | |



Ohio Division of Wildlife
Ohio Natural Heritage Database
Date Accessed: March 6, 2015
Status based on 2014-15 Rare Plant List.

Status:

X = Extirpated

E = Endangered

T = Threatened

P = Potentially Threatened

List Created: July 2016



OHIO'S LISTED SPECIES

**WILDLIFE THAT ARE CONSIDERED TO BE
ENDANGERED, THREATENED, SPECIES OF CONCERN,
SPECIAL INTEREST, EXTIRPATED, OR EXTINCT IN OHIO**



Blanding's turtle
Emydoidea blandingii

photo by TIM DANIEL



WILDLIFE THAT ARE CONSIDERED TO BE ENDANGERED, THREATENED, SPECIES OF CONCERN, SPECIAL INTEREST, EXTIRPATED, OR EXTINCT IN OHIO

The Division of Wildlife's mission is to conserve and improve the fish and wildlife resources and their habitats, and promote their use and appreciation by the public so that these resources continue to enhance the quality of life for all Ohioans. The Division has legal authority over Ohio's fish and wildlife, which includes about 56 species of mammals, 200 species of breeding birds, 84 species and subspecies of amphibians and reptiles, 170 species of fish, 100 species of mollusks, and 20 species of crustaceans. In addition, there are thousands of species of insects and other invertebrates which fall under the Division's jurisdiction. Furthermore, Ohio law grants authority to the chief of the Division to adopt rules restricting the taking or possession of native wildlife threatened with statewide extirpation and to develop and periodically update a list of endangered species (Ohio Revised Code 1531.25).

The status of native wildlife species is very important to the Division. While the listing process identifies individual wildlife species needing protection, it also serves as a powerful tool in the

Division's planning process. It provides direction for the allocation of personnel time and funds in Division programs and projects.

The first list of Ohio's endangered wildlife was adopted in 1974 and included 71 species. An extensive examination of the list is conducted every five years. The Division seeks input from our staff along with other noted professional and amateur wildlife experts across Ohio. In 2001, as part of our comprehensive management plan, the Division initiated a reevaluation of the endangered species list. During this process, the need for an additional state-list category was recognized and has been designated as "Special Interest." The name of the previous special interest category has been changed to "Species of Concern," but retains its original definition.

Therefore, in addition to endangered the Division uses five other categories: threatened, species of concern, special interest, extirpated, and extinct, to further define the status of selected wildlife. These categories and the species contained within them are dynamic and will be revised as our knowledge of the status of Ohio's wildlife evolves.

Definitions of these categories, a summary of the numbers of species and subspecies in each category, and the list of species and subspecies in each category follow:

■ **ENDANGERED** - A native species or subspecies threatened with extirpation from the state. The danger may result from one or more causes, such as habitat loss, pollution, predation, interspecific competition, or disease.

■ **THREATENED** - A species or subspecies whose survival in Ohio is not in immediate jeopardy, but to which a threat exists. Continued or increased stress will result in its becoming endangered.

■ **SPECIES OF CONCERN** - A species or subspecies which might become threatened in Ohio under continued or increased stress. Also, a species or subspecies for which there is some concern but for which information is insufficient to permit an adequate status evaluation. This category may contain species designated as a furbearer or game species but whose statewide population is dependent on the quality and/or quantity of habitat and is not adversely impacted by regulated harvest.

■ **SPECIAL INTEREST** - A species that occurs periodically and is capable of breeding in Ohio. It is at the edge of a larger, contiguous range with viable population(s) within the core of its range. These species have no federal endangered or threatened status, are at low breeding densities in the state, and have not been recently released to enhance Ohio's wildlife diversity. With the exception of efforts to conserve occupied areas, minimal management efforts will be directed for these species because it is unlikely to result in significant increases in their populations within the state.

■ **EXTIRPATED** - A species or subspecies that occurred in Ohio at the time of European settlement and that has since disappeared from the state.

■ **EXTINCT** - A species or subspecies that occurred in Ohio at the time of European settlement and that has since disappeared from its entire range.

**Number of Species in Major Taxa Classified as
Endangered, Threatened, Species of Concern, Special Interest,
Extirpated, or Extinct in Ohio**

| Taxon | Endangered | Threatened | Species of Concern | Special Interest | Extirpated | Extinct |
|------------------------|-------------------|-------------------|-------------------------------|-----------------------------|-------------------|----------------|
| Amphibians | 5 | 1 | 2 | 0 | 0 | 0 |
| Bees | 1 | 0 | 0 | 0 | 0 | 0 |
| Beetles | 3 | 2 | 7 | 0 | 0 | 1 |
| Birds | 12 | 6 | 20 | 38 | 5 | 2 |
| Butterflies | 8 | 1 | 2 | 1 | 1 | 0 |
| Caddisflies | 3 | 6 | 3 | 0 | 0 | 0 |
| Crayfishes | 0 | 2 | 3 | 0 | 0 | 0 |
| Crickets | 0 | 0 | 1 | 0 | 0 | 0 |
| Damselflies | 3 | 3 | 0 | 0 | 0 | 0 |
| Dragonflies | 13 | 3 | 1 | 0 | 0 | 0 |
| Fishes | 22 | 11 | 8 | 0 | 9 | 2 |
| Isopods | 2 | 1 | 0 | 0 | 0 | 0 |
| Mammals | 6 | 1 | 18 | 2 | 9 | 0 |
| Mayflies | 2 | 0 | 1 | 0 | 0 | 0 |
| Midges | 1 | 3 | 1 | 0 | 0 | 0 |
| Mollusks | 24 | 4 | 8 | 0 | 11 | 6 |
| Moths | 14 | 4 | 22 | 11 | 0 | 0 |
| Pseudoscorpions | 1 | 0 | 0 | 0 | 0 | 0 |
| Reptiles | 5 | 4 | 11 | 0 | 0 | 0 |
| Total | 125 | 52 | 108 | 52 | 35 | 11 |

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OHIO's ENDANGERED SPECIES

NOTE: *E & *T denote federal (U.S. Fish and Wildlife Service)
listed endangered and threatened species respectively.

AMPHIBIANS **ENDANGERED**

| | |
|-------------------------|---|
| Blue-spotted salamander | <i>Ambystoma laterale</i> |
| Cave salamander | <i>Eurycea lucifuga</i> |
| Eastern hellbender | <i>Cryptobranchus alleganiensis alleganiensis</i> |
| Eastern spadefoot | <i>Scaphiopus holbrookii</i> |
| Green salamander | <i>Aneides aeneus</i> |

BEES **ENDANGERED**

| | |
|----------------------------|-----------------------|
| Rusty patched bumblebee *E | <i>Bombus affinis</i> |
|----------------------------|-----------------------|

BEETLES **ENDANGERED**

| | |
|----------------------------|------------------------------------|
| American burying beetle *E | <i>Nicrophorus americanus</i> |
| Ohio cave beetle | <i>Pseudanophthalmus ohioensis</i> |
| Water penny beetle | <i>Dicranopselaphus variegatus</i> |

BIRDS **ENDANGERED**

| | |
|-----------------------|------------------------------|
| American bittern | <i>Botaurus lentiginosus</i> |
| Black tern | <i>Chlidonias niger</i> |
| Cattle egret | <i>Bubulcus ibis</i> |
| Common tern | <i>Sterna hirundo</i> |
| King rail | <i>Rallus elegans</i> |
| Kirtland's warbler *E | <i>Setophaga kirtlandii</i> |
| Lark sparrow | <i>Chondestes grammacus</i> |
| Loggerhead shrike | <i>Lanius ludovicianus</i> |
| Northern harrier | <i>Circus hudsonius</i> |
| Piping plover *E | <i>Charadrius melodus</i> |
| Snowy egret | <i>Egretta thula</i> |
| Upland sandpiper | <i>Bartramia longicauda</i> |

BUTTERFLIES **ENDANGERED**

| | |
|---------------------|-----------------------------------|
| Frosted elfin | <i>Callophrys irus</i> |
| Grizzled skipper | <i>Pyrgus centaureae wyandot</i> |
| Karner blue *E | <i>Lycaeides melissa samuelis</i> |
| Mitchell's satyr *E | <i>Neonympha mitchellii</i> |
| Persius dusky wing | <i>Erynnis persius</i> |
| Purplish copper | <i>Lycaena helloides</i> |
| Regal fritillary | <i>Speyeria idalia</i> |
| Swamp metalmark | <i>Calephelis muticum</i> |

CADDISFLIES **ENDANGERED**

| | |
|---|--------------------------------|
| – | <i>Brachycentrus nigrosoma</i> |
| – | <i>Chimarra socia</i> |
| – | <i>Oecetis eddlestoni</i> |

DAMSELFLIES **ENDANGERED**

| | |
|------------------|------------------------------|
| Lilypad forktail | <i>Ischnura kellicotti</i> |
| River jewelwing | <i>Calopteryx aequabilis</i> |
| Seepage dancer | <i>Argia bipunctulata</i> |

DRAGONFLIES **ENDANGERED**

| | |
|------------------------|-----------------------------|
| American emerald | <i>Cordulia shurtleffi</i> |
| Blue corporal | <i>Ladona deplanata</i> |
| Brush-tipped emerald | <i>Somatochlora walshii</i> |
| Canada darner | <i>Aeshna canadensis</i> |
| Chalk-fronted corporal | <i>Ladona julia</i> |
| Elfin skimmer | <i>Nannothemis bella</i> |
| Frosted whiteface | <i>Leucorrhinia frigida</i> |
| Hine's emerald *E | <i>Somatochlora hineana</i> |
| Mottled darner | <i>Aeshna clepsydra</i> |
| Plains clubtail | <i>Gomphus externus</i> |
| Racket-tailed emerald | <i>Dorocordulia libera</i> |
| Uhler's sun dragon | <i>Helocordulia uhleri</i> |
| Yellow-sided skimmer | <i>Libellula flavida</i> |

FISHES **ENDANGERED**

| | |
|-------------------------|------------------------------|
| Bigeye shiner | <i>Notropis boops</i> |
| Cisco (or Lake herring) | <i>Coregonus artedii</i> |
| Gilt darter | <i>Percina evides</i> |
| Goldeye | <i>Hiodon alosoides</i> |
| Iowa darter | <i>Etheostoma exile</i> |
| Lake sturgeon | <i>Acipenser fulvescens</i> |
| Longnose sucker | <i>Catostomus catostomus</i> |
| Mountain brook lamprey | <i>Ichthyomyzon greeleyi</i> |
| Northern brook lamprey | <i>Ichthyomyzon fossor</i> |
| Northern madtom | <i>Noturus stigmosus</i> |
| Ohio lamprey | <i>Ichthyomyzon bdellium</i> |
| Pirate perch | <i>Aphredoderus sayanus</i> |
| Popeye shiner | <i>Notropis ariommus</i> |

FISHES (CONT.) ENDANGERED

| | |
|--------------------------|-------------------------------------|
| Pugnose minnow | <i>Opsopoeodus emiliae</i> |
| Scioto madtom *E | <i>Noturus trautmani</i> |
| Shoal chub | <i>Macrhybopsis hyostoma</i> |
| Shortnose gar | <i>Lepisosteus platostomus</i> |
| Shovelnose sturgeon | <i>Scaphirhynchus platyrhynchus</i> |
| Spotted darter | <i>Etheostoma maculatum</i> |
| Spotted gar | <i>Lepisosteus oculatus</i> |
| Tonguetied minnow | <i>Exoglossum laurae</i> |
| Western banded killifish | <i>Fundulus diaphanus menona</i> |

ISOPODS ENDANGERED

| | |
|---------------------|----------------------------------|
| Fern cave isopod | <i>Caecidotea filicispelunca</i> |
| Kindt's cave isopod | <i>Caecidotea insula</i> |

MAMMALS ENDANGERED

| | |
|----------------------------|-------------------------------|
| Allegheny woodrat | <i>Neotoma magister</i> |
| Black bear | <i>Ursus americanus</i> |
| Indiana myotis *E | <i>Myotis sodalis</i> |
| Little brown bat | <i>Myotis lucifugus</i> |
| Northern long-eared bat *T | <i>Myotis septentrionalis</i> |
| Tri-colored bat | <i>Perimyotis subflavus</i> |

MAYFLIES ENDANGERED

| | |
|---|------------------------------|
| — | <i>Rhithrogena pellucida</i> |
| — | <i>Litobrantha recurvata</i> |

MIDGES ENDANGERED

| | |
|---|-------------------------|
| — | <i>Rheopelopia acra</i> |
|---|-------------------------|

MOLLUSKS ENDANGERED

| | |
|-------------------------|---------------------------------------|
| Butterfly | <i>Ellipsaria lineolata</i> |
| Clubshell *E | <i>Pleurobema clava</i> |
| Eastern pondmussel | <i>Ligumia nasuta</i> |
| Ebonyshell | <i>Reginaia ebenas</i> |
| Elephantear | <i>Elliptio crassidens crassidens</i> |
| Fanshell *E | <i>Cyprogenia stegaria</i> |
| Little spectaclecase | <i>Villosa lienosa</i> |
| Long-solid | <i>Fusconaia subrotunda</i> |
| Monkeyface | <i>Theliderma metanevra</i> |
| Northern riffleshell *E | <i>Epioblasma rangiana</i> |
| Ohio pigtoe | <i>Pleurobema cordatum</i> |
| Pink mucket *E | <i>Lampsilis abrupta</i> |
| Pocketbook | <i>Lampsilis ovata</i> |
| Purple catpaw *E | <i>Epioblasma obliquata</i> |

MOLLUSKS (CONT.) ENDANGERED

| | |
|------------------|------------------------------|
| Purple lilliput | <i>Toxolasma lividum</i> |
| Pyramid pigtoe | <i>Pleurobema rubrum</i> |
| Rabbitsfoot *T | <i>Theliderma cylindrica</i> |
| Rayed bean *E | <i>Villosa fabalis</i> |
| Sheepnose *E | <i>Plethobasus cyphus</i> |
| Snuffbox *E | <i>Epioblasma triquetra</i> |
| Wartyback | <i>Cyclonaias nodulata</i> |
| Washboard | <i>Megaloniais nervosa</i> |
| White catpaw *E | <i>Epioblasma perobliqua</i> |
| Yellow sandshell | <i>Lampsilis teres</i> |

MOTHS ENDANGERED

| | |
|-----------------------|-----------------------------|
| Graceful underwing | <i>Catocala gracilis</i> |
| Hairy artesa moth | <i>Sideridis artesta</i> |
| Hebard's noctuid moth | <i>Erythroecia hebardii</i> |
| Pointed swallow | <i>Epiglaea apiata</i> |
| Unexpected cynia | <i>Cynia inopinatus</i> |
| — | <i>Hypocoena enervata</i> |
| — | <i>Lithophane semiusta</i> |
| — | <i>Melanchra assimilis</i> |
| — | <i>Papaipema beeriana</i> |
| — | <i>Papaipema silphii</i> |
| — | <i>Spartiniphaga inops</i> |
| — | <i>Tricholita notata</i> |
| — | <i>Ufeus plicatus</i> |
| — | <i>Ufeus satyricus</i> |

PSEUDOSCORPIONS ENDANGERED

| | |
|------------------------------|----------------------------|
| Buckskin cave pseudoscorpion | <i>Apochthonius hobbsi</i> |
|------------------------------|----------------------------|

REPTILES ENDANGERED

| | |
|---------------------------|---------------------------------------|
| Copperbelly watersnake *T | <i>Nerodia erythrogaster neglecta</i> |
| Massasauga *T | <i>Sistrurus catenatus</i> |
| Plains gartersnake | <i>Thamnophis radix</i> |
| Smooth greensnake | <i>Opheodrys vernalis</i> |
| Timber rattlesnake | <i>Crotalus horridus</i> |

OHIO's THREATENED SPECIES

NOTE: *E & *T denote federal (U.S. Fish and Wildlife Service)
listed endangered and threatened species respectively.

AMPHIBIANS THREATENED

| | |
|------------------------|---|
| Midland mud salamander | <i>Pseudotriton montanus diastictus</i> |
|------------------------|---|

BEETLES THREATENED

| | |
|--------------------------|--------------------------------|
| Cobblestone tiger beetle | <i>Cicindela marginipennis</i> |
| — | <i>Cicindela hirticollis</i> |

BIRDS THREATENED

| | |
|---------------------------|------------------------------|
| Barn owl | <i>Tyto alba</i> |
| Black-crowned night-heron | <i>Nycticorax nycticorax</i> |
| Least bittern | <i>Ixobrychus exilis</i> |
| Rufa red knot *T | <i>Calidris canutus rufa</i> |
| Sandhill crane | <i>Antigone canadensis</i> |
| Trumpeter swan | <i>Cygnus buccinator</i> |

BUTTERFLIES THREATENED

| | |
|----------------------------|-----------------------|
| Silver-bordered fritillary | <i>Boloria selene</i> |
|----------------------------|-----------------------|

CADDISFLIES THREATENED

| | |
|---|------------------------------|
| — | <i>Hydroptila albicornis</i> |
| — | <i>Hydroptila artesa</i> |
| — | <i>Hydroptila koryaki</i> |
| — | <i>Hydroptila talledaga</i> |
| — | <i>Hydroptila valhalla</i> |
| — | <i>Psilotreta indecisa</i> |

CRAYFISHES THREATENED

| | |
|---------------------|----------------------------|
| Cavespring crayfish | <i>Cambarus tenebrosus</i> |
|---------------------|----------------------------|

DAMSELFLIES THREATENED

| | |
|----------------|------------------------------|
| Boreal bluet | <i>Enallagma boreale</i> |
| Marsh bluet | <i>Enallagma ebrium</i> |
| Northern bluet | <i>Enallagma cyathigerum</i> |

DRAGONFLIES THREATENED

| | |
|----------------------|--------------------------------|
| Green-faced clubtail | <i>Gomphus viridifrons</i> |
| Harlequin darter | <i>Gomphaeschna furcillata</i> |
| Riffle snaketail | <i>Ophiogomphus carolus</i> |

FISHES THREATENED

| | |
|-------------------|--------------------------------|
| American eel | <i>Anguilla rostrata</i> |
| Bigmouth shiner | <i>Notropis dorsalis</i> |
| Blue sucker | <i>Cycleptus elongatus</i> |
| Brook trout | <i>Salvelinus fontinalis</i> |
| Channel darter | <i>Percina copelandi</i> |
| Greater redhorse | <i>Moxostoma valenciennesi</i> |
| Lake chubsucker | <i>Erimyzon sucetta</i> |
| Mountain madtom | <i>Noturus eleutherus</i> |
| Paddlefish *M | <i>Polyodon spathula</i> |
| River darter | <i>Percina shumardi</i> |
| Tippecanoe darter | <i>Etheostoma tippecanoe</i> |

ISOPODS THREATENED

| | |
|-------------------|---------------------------|
| Frost cave isopod | <i>Caecidotea rotunda</i> |
|-------------------|---------------------------|

MAMMALS THREATENED

| | |
|-----------------------|--------------------------------|
| Eastern harvest mouse | <i>Reithrodontomys humulis</i> |
|-----------------------|--------------------------------|

MIDGES THREATENED

| | |
|---|----------------------------------|
| — | <i>Apsectrotanypus johnsoni</i> |
| — | <i>Bethbilbeckia floridensis</i> |
| — | <i>Radotanypus florens</i> |

MOLLUSKS THREATENED

| | |
|---------------------|-------------------------------|
| Black sandshell | <i>Ligumia recta</i> |
| Fawnsfoot | <i>Truncilla donaciformis</i> |
| Pondhorn | <i>Unimetus tetralasmus</i> |
| Threehorn wartyback | <i>Obliquaria reflexa</i> |

MOTHS THREATENED

| | |
|-----------------|-------------------------------|
| The pink-streak | <i>Faronta rubripennis</i> |
| Wayward nymph | <i>Catocala antinympha</i> |
| — | <i>Fagitana littera</i> |
| — | <i>Spartiniphaga panatela</i> |

REPTILES THREATENED

| | |
|----------------------|----------------------------------|
| Blanding's turtle | <i>Emydoidea blandingii</i> |
| Kirtland's snake | <i>Clonophis kirtlandii</i> |
| Lake Erie watersnake | <i>Nerodia sipedon insularum</i> |
| Spotted turtle | <i>Clemmys guttata</i> |

OHIO's SPECIES of CONCERN

NOTE: *E & *T denote federal (U.S. Fish and Wildlife Service)
listed endangered and threatened species respectively.

AMPHIBIANS SPECIES OF CONCERN

| | |
|--------------------------|-------------------------------|
| Blanchard's cricket frog | <i>Acris blanchardi</i> |
| Four-toed salamander | <i>Hemidactylium scutatum</i> |

BEETLES SPECIES OF CONCERN

| | |
|----------------------------|----------------------------------|
| Six-banded longhorn beetle | <i>Dryobius sexnotatus</i> |
| Whirligig beetle | <i>Gyrinus sinuatus</i> |
| – | <i>Cicindela ancocisconensis</i> |
| – | <i>Cicindela cuprascens</i> |
| – | <i>Cicindela cursitans</i> |
| – | <i>Cicindela macra</i> |
| – | <i>Cicindela splendida</i> |

BIRDS SPECIES OF CONCERN

| | |
|------------------------|-----------------------------------|
| American coot | <i>Fulica americana</i> |
| Black-billed cuckoo | <i>Coccyzus erythrophthalmus</i> |
| Bobolink | <i>Dolichonyx oryzivorus</i> |
| Cerulean warbler | <i>Setophaga cerulea</i> |
| Common gallinule | <i>Gallinula galeata</i> |
| Common nighthawk | <i>Chordeiles minor</i> |
| Eastern whip-poor-will | <i>Antrostomus vociferous</i> |
| Grasshopper sparrow | <i>Ammodramus savannarum</i> |
| Great egret | <i>Ardea alba</i> |
| Marsh wren | <i>Cistothorus palustris</i> |
| Henslow's sparrow | <i>Centronyx henslowii</i> |
| Northern bobwhite | <i>Colinus virginianus</i> |
| Prothonotary warbler | <i>Protonotaria citrea</i> |
| Red-headed woodpecker | <i>Melanerpes erythrocephalus</i> |
| Ruffed grouse | <i>Bonasa umbellus</i> |
| Sedge wren | <i>Cistothorus platensis</i> |
| Sharp-shinned hawk | <i>Accipiter striatus</i> |
| Sora | <i>Porzana carolina</i> |
| Vesper sparrow | <i>Pooecetes gramineus</i> |
| Virginia rail | <i>Rallus limicola</i> |

BUTTERFLIES SPECIES OF CONCERN

| | |
|---------------------|----------------------------|
| Dusted skipper | <i>Atrytonopsis hianna</i> |
| Two-spotted skipper | <i>Euphyes bimacula</i> |

CADDISFLIES SPECIES OF CONCERN

| | |
|---|-------------------------------|
| – | <i>Asynarchus montanus</i> |
| – | <i>Hydroptila chattanooga</i> |
| – | <i>Nemotaulius hostilis</i> |

CRAYFISHES SPECIES OF CONCERN

| | |
|----------------------|------------------------------|
| Allegheny crayfish | <i>Orconectes obscurus</i> |
| Great Lakes crayfish | <i>Orconectes propinquus</i> |
| Northern crayfish | <i>Orconectes virilis</i> |

CRICKETS SPECIES OF CONCERN

| | |
|----------------------|--------------------------|
| Laricis tree cricket | <i>Oecanthus laricis</i> |
|----------------------|--------------------------|

DRAGONFLIES SPECIES OF CONCERN

| | |
|-----------------|------------------------------|
| Tiger spiketail | <i>Cordulegaster erronea</i> |
|-----------------|------------------------------|

FISHES SPECIES OF CONCERN

| | |
|--------------------------|-------------------------------|
| Blue catfish | <i>Ictalurus furcatus</i> |
| Burbot | <i>Lota lota</i> |
| Lake trout | <i>Salvelinus namaycush</i> |
| Lake whitefish | <i>Coregonus clupeaformis</i> |
| Least darter | <i>Etheostoma microperca</i> |
| Longnose dace | <i>Rhinichthys cataractae</i> |
| Muskellunge | <i>Esox masquinongy</i> |
| Western creek chubsucker | <i>Erimyzon claviformis</i> |

MAMMALS SPECIES OF CONCERN

| | |
|----------------------------|----------------------------------|
| Badger | <i>Taxidea taxus</i> |
| Big brown bat | <i>Eptesicus fuscus</i> |
| Deer mouse | <i>Peromyscus maniculatus</i> |
| Eastern small-footed bat | <i>Myotis leibii</i> |
| Ermine | <i>Mustela erminea</i> |
| Gray Fox | <i>Urocyon cinereoargenteus</i> |
| Hoary bat | <i>Lasiurus cinereus</i> |
| Prairie vole | <i>Microtus ochrogaster</i> |
| Pygmy shrew | <i>Sorex hoyi</i> |
| Rafinesque's big-eared bat | <i>Corynorhinus rafinesquii</i> |
| Red bat | <i>Lasiurus borealis</i> |
| Silver-haired bat | <i>Lasionycteris noctivagans</i> |

MAMMALS (CONT.) SPECIES OF CONCERN

| | |
|------------------------|-----------------------------|
| Smoky shrew | <i>Sorex fumeus</i> |
| Snowshoe hare | <i>Lepus americanus</i> |
| Southern bog lemming | <i>Synaptomys cooperi</i> |
| Star-nosed mole | <i>Condylura cristata</i> |
| Woodland jumping mouse | <i>Napaeozapus insignis</i> |
| Woodland vole | <i>Microtus pinetorum</i> |

MAYFLIES SPECIES OF CONCERN

| | |
|---|-----------------------------|
| – | <i>Maccaffertium ithaca</i> |
|---|-----------------------------|

MIDGES SPECIES OF CONCERN

| | |
|---|---------------------------|
| – | <i>Cantopelopia gesta</i> |
|---|---------------------------|

MOLLUSKS SPECIES OF CONCERN

| | |
|----------------------|-----------------------------------|
| Creek heelsplitter | <i>Lasmigona compressa</i> |
| Deertoe | <i>Truncilla truncata</i> |
| Elktoe | <i>Alasmidonta marginata</i> |
| Kidneyshell | <i>Ptychobranchus fasciolaris</i> |
| Purple wartyback | <i>Cyclonaias tuberculata</i> |
| Round pigtoe | <i>Pleurobema sintoxia</i> |
| Salamander mussel | <i>Simpsonaias ambigua</i> |
| Wavyrayed lampmussel | <i>Lampsilis fasciola</i> |

MOTHS SPECIES OF CONCERN

| | |
|----------------------------|--------------------------------|
| Bracken borer moth | <i>Papaipema pterisii</i> |
| Buck moth | <i>Hemileuca maia</i> |
| Columbine borer | <i>Papaipema leucostigma</i> |
| Curved halter moth | <i>Capis curvata</i> |
| Goat sawfly | <i>Homoglaea hircina</i> |
| Milnei's looper moth | <i>Euchlaena milnei</i> |
| One-eyed sphinx | <i>Smerinthus cerisyi</i> |
| Osmunda borer moth | <i>Papaipema speciosissima</i> |
| Prairie bird-dropping moth | <i>Ponomotia binocula</i> |
| Precious underwing | <i>Catocala pretiosa</i> |
| Purple arches | <i>Polia purpurissata</i> |
| Scurfy quaker | <i>Homorthodes furfurata</i> |
| – | <i>Agonopterix pteleae</i> |
| – | <i>Amolita roseola</i> |
| – | <i>Apamea lutosa</i> |
| – | <i>Brachylomia algens</i> |
| – | <i>Chytonix sensilis</i> |

MOTHS (CONT.) SPECIES OF CONCERN

| | |
|---|------------------------------|
| – | <i>Feltia manifesta</i> |
| – | <i>Macrochilo bivittata</i> |
| – | <i>Melanapamea mixta</i> |
| – | <i>Paectes abrostoloides</i> |
| – | <i>Phalaenostola hanhami</i> |

REPTILES SPECIES OF CONCERN

| | |
|----------------------------------|-------------------------------------|
| Eastern black kingsnake | <i>Lampropeltis nigra</i> |
| Eastern foxsnake | <i>Pantherophis vulpinus</i> |
| Eastern gartersnake (melanistic) | <i>Thamnophis sirtalis sirtalis</i> |
| Eastern hognose snake | <i>Heterodon platirhinos</i> |
| Eastern smooth earthsnake | <i>Virginia valeriae valeriae</i> |
| Little brown skink | <i>Scincella lateralis</i> |
| Northern rough greensnake | <i>Opheodrys aestivus</i> |
| Ouachita map turtle | <i>Graptemys ouachitensis</i> |
| Queensnake | <i>Regina septemvittata</i> |
| Short-headed gartersnake | <i>Thamnophis brachystoma</i> |
| Woodland box turtle | <i>Terrapene carolina carolina</i> |

OHIO's SPECIAL INTEREST

NOTE: *E & *T denote federal (U.S. Fish and Wildlife Service)
listed endangered and threatened species respectively.

BIRDS SPECIAL INTEREST

| | |
|-----------------------------|--------------------------------------|
| American black duck | <i>Anas rubripes</i> |
| Bell's vireo | <i>Vireo bellii</i> |
| Blackburnian warbler | <i>Setophaga fusca</i> |
| Black-throated blue warbler | <i>Setophaga caerulescens</i> |
| Blue-headed vireo | <i>Vireo solitarius</i> |
| Brown creeper | <i>Certhia americana</i> |
| Canada warbler | <i>Cardellina canadensis</i> |
| Chuck-will's-widow | <i>Antrostomus carolinensis</i> |
| Common merganser | <i>Mergus merganser</i> |
| Common raven | <i>Corvus corax</i> |
| Dark-eyed junco | <i>Junco hyemalis</i> |
| Gadwall | <i>Mareca strepera</i> |
| Golden-crowned kinglet | <i>Regulus satrapa</i> |
| Golden-winged warbler | Golden-winged warbler |
| Green-winged teal | <i>Anas crecca</i> |
| Hermit thrush | <i>Catharus guttatus</i> |
| Least flycatcher | <i>Empidonax minimus</i> |
| Long-eared owl | <i>Asio otus</i> |
| Magnolia warbler | <i>Setophaga magnolia</i> |
| Mourning warbler | <i>Geothlypis philadelphia</i> |
| Nashville warbler | <i>Leiostyris alpestris</i> |
| Northern pintail | <i>Anas acuta</i> |
| Northern saw-whet owl | <i>Aegolius acadicus</i> |
| Northern shoveler | <i>Spatula clypeata</i> |
| Northern waterthrush | <i>Parkesia noveboracensis</i> |
| Pine siskin | <i>Spinus pinus</i> |
| Purple finch | <i>Haemorhous purpureus</i> |
| Red-breasted nuthatch | <i>Sitta canadensis</i> |
| Redhead | <i>Aythya americana</i> |
| Ruddy duck | <i>Oxyura jamaicensis</i> |
| Short-eared owl | <i>Asio flammeus</i> |
| Veery | <i>Catharus fuscescens</i> |
| Western meadowlark | <i>Sturnella neglecta</i> |
| Wilson's phalarope | <i>Phalaropus tricolor</i> |
| Wilson's snipe | <i>Gallinago delicata</i> |
| Winter wren | <i>Troglodytes hiemalis</i> |
| Yellow-crowned night-heron | <i>Nyctanassa violacea</i> |
| Yellow-headed blackbird | <i>Xanthocephalus xanthocephalus</i> |

BUTTERFLIES SPECIAL INTEREST

| | |
|----------------|------------------------|
| Olympia marble | <i>Euchloe olympia</i> |
|----------------|------------------------|

MAMMALS SPECIAL INTEREST

| | |
|-------------|-----------------------------|
| Evening bat | <i>Nycticeius humeralis</i> |
| Fisher | <i>Pekania pennanti</i> |

MOTHS SPECIAL INTEREST

| | |
|---------------------------|---------------------------------|
| Banded Quaker | <i>Protorthodes incincta</i> |
| Clemen's sphinx | <i>Sphinx luscitiosa</i> |
| Heterodox wainscot | <i>Leucania insueta</i> |
| Marbled underwing | <i>Catocala marmorata</i> |
| Sad underwing | <i>Catocala maestosa</i> |
| Slender clearwing | <i>Hemaris gracilis</i> |
| Subflava sedge borer moth | <i>Archanara subflava</i> |
| Toadflax brocade | <i>Calophasia lunula</i> |
| Variegated orange moth | <i>Epelis truncataria</i> |
| — | <i>Caradrina meralis</i> |
| — | <i>Tathorhynchus exsiccatus</i> |

OHIO's EXTIRPATED SPECIES

NOTE: *E & *T denote federal (U.S. Fish and Wildlife Service)
listed endangered and threatened species respectively.

BIRDS EXTIRPATED

| | |
|-------------------------|--------------------------------|
| Bachman's sparrow | <i>Peucaea aestivalis</i> |
| Bewick's wren | <i>Thryomanes bewickii</i> |
| Greater prairie-chicken | <i>Tympanuchus cupido</i> |
| Ivory-billed woodpecker | <i>Campephilus principalis</i> |
| Swallow-tailed kite | <i>Elanoides forficatus</i> |

BUTTERFLIES EXTIRPATED

| | |
|---------------|--------------------|
| Mustard white | <i>Pieris napi</i> |
|---------------|--------------------|

FISHES EXTIRPATED

| | |
|-----------------------------|--------------------------------|
| Alligator gar | <i>Lepisosteus spatula</i> |
| Blackchin shiner | <i>Notropis heterodon</i> |
| Blacknose shiner | <i>Notropis heterolepis</i> |
| Diamond darter | <i>Crystallaria cincotta</i> |
| Great Lakes mottled sculpin | <i>Cottus bairdii kumlieni</i> |
| Longhead darter | <i>Percina macrocephala</i> |
| Mississippi silvery minnow | <i>Hybognathus nuchalis</i> |
| Pugnose shiner | <i>Notropis anogenus</i> |
| Spoonhead sculpin | <i>Cottus ricei</i> |

MAMMALS EXTIRPATED

| | |
|--------------------------|---------------------------|
| Bison | <i>Bison bison</i> |
| Canada lynx *T | <i>Lynx canadensis</i> |
| Gray wolf *E | <i>Canis lupus</i> |
| Marten | <i>Martes americana</i> |
| Mountain lion | <i>Puma concolor</i> |
| Porcupine | <i>Erethizon dorsatum</i> |
| Rice rat | <i>Oryzomys palustris</i> |
| Southern red-backed vole | <i>Myodes gapperi</i> |
| Wapiti (Elk) | <i>Cervus elaphus</i> |

MOLLUSKS EXTIRPATED

| | |
|---------------------------|---------------------------------|
| Cracking pearly mussel *E | <i>Hemistena lata</i> |
| Fat pocketbook *E | <i>Potamilus capax</i> |
| Hickorynut | <i>Obovaria olivaria</i> |
| Mucket | <i>Actinonaias ligamentina</i> |
| Orangefoot pimpleback *E | <i>Plethobasus cooperianus</i> |
| Ring pink | <i>Obovaria retusa</i> |
| Rough pigtoe *E | <i>Pleurobema plenum</i> |
| Scale shell | <i>Leptodea leptodon</i> |
| Spectaclecase | <i>Margaritifera monodonta</i> |
| White wartyback | <i>Plethobasus cicatricosus</i> |
| Winged mapleleaf *E | <i>Quadrula fragosa</i> |

OHIO's EXTINCT SPECIES

NOTE: *E & *T denote federal (U.S. Fish and Wildlife Service)
listed endangered and threatened species respectively.

BEETLES EXTINCT

| | |
|----------------------|----------------------------------|
| Kramer's cave beetle | <i>Pseudanophthalmus krameri</i> |
|----------------------|----------------------------------|

BIRDS EXTINCT

| | |
|-------------------|--------------------------------|
| Carolina parakeet | <i>Conuropsis carolinensis</i> |
| Passenger pigeon | <i>Ectopistes migratorius</i> |

FISHES EXTINCT

| | |
|----------------|-------------------------------|
| Harelip sucker | <i>Lagochila lacera</i> |
| Blue pike | <i>Sander vitreus glaucus</i> |

MOLLUSKS EXTINCT

| | |
|------------------------|-------------------------------------|
| Leafshell | <i>Epioblasma flexuosa</i> |
| Forkshell | <i>Epioblasma lewisi</i> |
| Round snuffbox | <i>Epioblasma personata</i> |
| Cincinnati riffleshell | <i>Epioblasma phillipsi</i> |
| Scioto pigtoe | <i>Pleurobema bournianum</i> |
| Tubercled blossom | <i>Epioblasma torulosa torulosa</i> |

Juliet Solar Project

APPENDIX

D

SURFACE WATER DELINEATION
REPORT AND FORMS

Wetland and Waterbody Delineation Report Juliet Solar Project

February 2021



Document Information

Prepared for 7X Energy, Inc.
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Juliet Solar Project
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Acronyms

| | |
|---------|--|
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| DOW | Division of Wildlife |
| EPA | Environmental Protection Agency |
| EWH | Exceptional Warmwater Habitat |
| FAC | Facultative Plants |
| FACU | Facultative Upland Plants |
| FACW | Facultative Wetland Plants |
| FLS | Federally Listed Species |
| GIS | Geographic Information Systems |
| GPS | Global Positioning System |
| HDD | Horizontal Directional Drill |
| HHEI | Headwater Habitat Evaluation Index |
| HUC | Hydrologic Unit Code |
| JD | Jurisdictional Determination |
| LRW | Limited Resource Water |
| MRLC | Multi-Resolution Land Characteristics Consortium |
| MW | Megawatt |
| MWH | Modified Warmwater Habitat |
| NHD | National Hydrography Dataset |
| NLCD | National Land Cover Database |
| NRCS | Natural Resources Conservation Service |
| NWI | National Wetland Inventory |
| OBL | Obligate Wetland Plants |
| ODGS | Ohio Division of Geological Survey |
| ODNR | Ohio Department of Natural Resources |
| OEPA | Ohio Environmental Protection Agency |
| OHWM | Ordinary High Water Mark |
| ORAM | Ohio Rapid Assessment Methodology |
| OWI | Ohio Wetland Inventory |
| PEM | Palustrine Emergent Wetlands |
| PFO | Palustrine Forested Wetlands |
| PHWH | Primary Headwater Habitat |
| Project | Juliet Solar Project |
| PSS | Palustrine Scrub Shrub Wetlands |

| | |
|-------|--|
| QHEI | Qualitative Habitat Evaluation Index |
| RTE | Rare, Threatened or Endangered species |
| UNT | Unnamed Tributary |
| UPL | Upland Plants |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish & Wildlife Service |
| USGS | U.S. Geologic Survey |
| WOTUS | Waters of the United States |
| WWH | Warmwater Habitat |

1 Introduction

Juliet Energy Project, LLC, an affiliate of 7X Energy, is proposing to construct the Juliet Solar Project (Project) near Weston, Ohio, which is located approximately 8 miles southwest of Bowling Green, Ohio. The Project is proposed as a 101 megawatt (MW) solar project within an area of approximately 671 acres (1.05 square miles) on leased private lands as well as easement(s) (Project Area). The Project Area is split between the Village of Weston and Milton Township in Wood County, Ohio (Figure 1-1).

In support of planning for the Project, Cardno conducted a field survey to identify potential wetlands and waterbodies of the United States, in accordance with Sections 401/404 of the Clean Water Act (CWA). Cardno's field efforts focused on accessible parcels within the Project Area, totaling approximately 671 acres on 37 leased parcels.

The proposed Project infrastructure will include solar panels on metal racking ("arrays"), inverter pads, buried collection lines, access roads, a Project substation, pyranometer station(s), a generation tie line, and temporary equipment laydown areas. Project details regarding infrastructure are still being developed.

This report describes the methodology used by Cardno to complete the wetland delineation survey and the results of a desktop assessment and field survey. Specifically, Section 2 of the report identifies the methodology used during the identification of wetlands and surface waters within the Project Area. Section 3 of the report outlines the findings of the desktop assessment of the Project Area. Section 4 of the report details the results of the field surveys. Section 5 presents the conclusions of the delineation and site survey. Section 6 provides a list of references cited in this report.

The report is accompanied by several appendices. Appendix A contains representative photographic documentation of the delineated wetland and waterbody features. Appendix B contains maps depicting the delineated wetlands and waterbodies. Appendix C contains the completed wetland data and assessment forms from the field efforts. Appendix D contains the completed stream assessment forms.

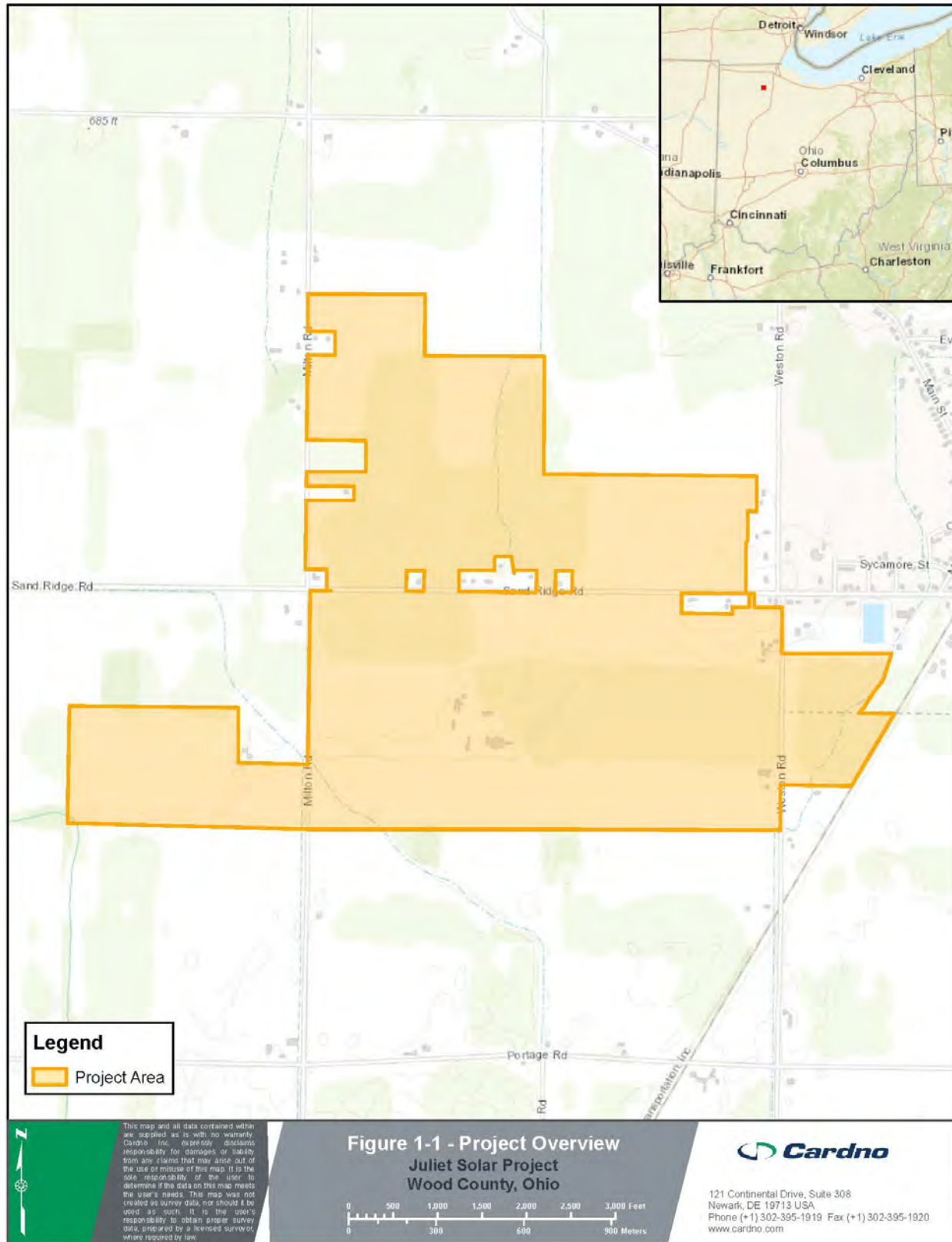


Figure 1-1 Project Overview

2 Survey Methodology

This section of the report identifies the methodologies used during the desktop review and field delineations of wetland and open waterbodies within the Project Area. During October 2020, Cardno conducted surveys within 37 parcels of property that totaled approximately 671 acres. Surveyed areas included a moderate buffer (25 feet) along edges of contiguous woodlots because there may be some tree removal necessary to increase solar array productivity along the fringe of the woodlots.

2.1 Desktop Review

Prior to field surveys, Cardno conducted a desktop review of the Project Area using publically available Geographic Information Systems (GIS) data to identify and classify potential environmental resources and create field maps for use during survey. Sources of this reference material included, but was not limited to: the National Land Cover Database (NLCD); the U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Soil Survey for Wood County; historic aerial photographs; U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps; U.S. Geologic Service (USGS) topographic maps; the USGS National Hydrography Dataset (NHD); and the Ohio Wetland Inventory (OWI).

2.2 Field Delineation Methodologies

Surveys were conducted in the Project Area to determine the extent of wetlands and waterbodies in accordance with applicable Federal and State regulations and guidelines. A Trimble® Global Positioning System (GPS) with sub-meter accuracy was used to collect data points for mapping. As wetland and waterbody point features were collected, they were assigned a FEATURE_ID with the following format:

| F-XXX |
|---|
| where: F = Feature Type |
| S – Stream |
| W – Wetland |
| XXX = Three-digit number as the unique identifier |

The information collected in the field was processed real-time in the field using Satellite Based Augmentation System and verified by the field team for accuracy. If a feature continued outside of the Project Area, it was noted by the field teams.

2.2.1 Wetland Delineation Methodologies

Wetland delineations were conducted according to the 1987 U.S. Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the applicable regional supplements; *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)* (USACE 2012). Together, these documents are referred to as “The Manual.” The methodology outlined in the Manual requires that three wetland criteria be met in order for a wetland to be determined to be present; that is, the area being evaluated must have a dominance of hydrophytic vegetation, hydric soils, and sufficient hydrology to be identified as a wetland.

Dominant vegetation is assessed for hydrophytic preference. The hydrophytic vegetation criterion is met when more than 50 percent of the dominant plant community is hydrophytic, as determined by species dominance and the assigned species-specific indicator status of the identified species. Table 2-1 shows the indicator status categories for plants.

Table 2-1 Plant Indicator Categories

| Indicator Category | Indicator Symbol | Definition |
|----------------------------|------------------|---|
| Obligate Wetland Plants | OBL | Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1 percent) in non-wetlands. |
| Facultative Wetland Plants | FACW | Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands. |
| Facultative Plants | FAC | Plants with a similar likelihood (estimated probability 33 percent to 67 percent) of occurring in both wetlands and non-wetlands. |
| Facultative Upland Plants | FACU | Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands. |
| Obligate Upland Plants | UPL | Plants that occur rarely (estimated probability <1 percent) in wetlands, but occur almost always (estimated probability >99 percent) in non-wetlands under natural conditions. |

After identifying the plant species present within a sampling area of a potential wetland, the dominance and indicator status for each identified unique species was determined. Based on the results, the vegetation community being evaluated was determined to be indicative of a either wetland or non-wetland.

Under certain circumstances, such as after disturbance from storm events or surveys occurring outside of the prime growing season, additional methods are employed to evaluate the vegetative communities of suspected wetlands. This can include calculating a prevalence index which weights the coverage of a particular class of species (using its wetland indicator status) against the total coverage within the sampling area. If a sampling area passes this test (which requires the value to be less than or equal to 3), it can be considered a wetland. Another potential evaluation method is the presence of morphological adaptations, which can include root buttressing, shallow roots, or multi-stemmed trunks. The presence of such adaptations is considered evidence that the plants (even FACU species) have adapted to survive in prolonged inundation or root saturation. Another method is to report "Problematic Hydrophytic Vegetation." This method is used sparingly, and reflects the delineator's opinion that conditions outside of those considered normal may be present, such as vegetation being bent or damaged to such a degree that identification to species level is impracticable. Under this method, the vegetation present would be treated as consistent with a wetland, but the vegetation could not be reliably identified.

The hydric soils criterion is met when the soils identified are officially listed as hydric soils or the soils demonstrate characteristics representative of soils in reducing (hydric) conditions. The latter is determined in the field when the soils fall within the hydric ranges on the Munsell Color Chart, examining soil profiles for other evidence of reducing conditions, and/or observing other indicators of anaerobic activity per the Manual.

The hydrology criterion is met when sufficient hydrologic indicators are present. The indicators must be representative of sufficient saturation or inundation occurring over the growing season sufficient to support a hydrophytic plant-dominated vegetative community. Such indicators may include evidence of standing water, saturated soils, geomorphic position within the landscape, drainage patterns, water-stained leaves, and morphologic adaptation of vegetation.

Wetland delineation data are reported on routine wetland determination data forms. The perimeter of each wetland is mapped using the GPS systems. In addition to identifying the boundaries of wetlands, additional data points are taken with the GPS to locate delineation data collection center points.

After delineations, the identified wetlands are scored using the Ohio Environmental Protection Agency's (OEPA) Ohio Rapid Assessment Method (ORAM). The ORAM wetland functional assessment was developed to determine the ecological "quality" and level of function of a particular wetland in order to meet requirements under Section 401 of the CWA. Wetlands are scored on the basis of hydrology, upland buffer, habitat alteration, special wetland communities, and vegetation communities. Each of these subject areas is further divided into sub-categories under ORAM v5.0 resulting in a score that describes the wetland using a range from 0 (low quality and high disturbance) to 100 (high quality and low disturbance).

Wetlands scored from 0 to 29.9 are grouped into "Category 1," 30 to 59.90 are "Category 2" and 60 to 100 are "Category 3." Transitional "Gray" zones exist between "Categories 1 and 2" from 30 to 34.9 and between "Categories 2 and 3" from 60 to 64.9. However, wetland scores that fall into one of these transitional ranges should be assigned to the higher category unless additional data collection characterizes the wetlands as a lower category.

Category 1 consists of wetlands that are often isolated emergent marshes dominated by cattails with little or no upland buffers located in active agricultural fields. Category 2 consists of wetlands for which rare, threatened or endangered (RTE) species and their habitat are absent, but may have well developed habitat for other more common species. Category 2 wetlands constitute the broad middle category of "good" quality wetlands. A "Modified Category 2" wetland appears to have some signs of degradation but also has the potential to restore some of the lost functionality. Category 3 wetlands are typified by high levels of diversity, a high proportion of native species, and/or high functional values. Category 3 wetlands include wetlands that contain or provide habitat for threatened or endangered species, are high quality mature forested wetlands, vernal pools, bogs, fens, or which are scarce regionally and/or statewide.

2.2.2 Waterbody Delineation Methodologies

Linear waterbodies, such as ditches and streams, were surveyed by locating the path (typically the centerline if water depth was shallow, or the top-of-bank if the centerline was not accessible) and documenting widths (both as Ordinary High Water Mark (OHWM) to OHWM and top-of-bank to top-of-bank) at each survey point. Observational notes about the characteristics of each waterbody (such as flow regime and substrate) were recorded by the field team to enable the categorization of the types of waterbodies encountered. To be classified as a waterbody, however, each feature must have a defined bed and bank with indications of a channel flow; grassy swales are not waterbodies, and are not identified as such. Table 2-2 identifies the definitions used in assigning waterbody flow.

Table 2-2 Waterbody Flow Categories

| Flow Category | Definition |
|---------------|---|
| Perennial | Flow is continuous and likely permanent across the seasons (although it may vary). Such flow can be surface based or occur as interstitial flow, which would include the flow driving underground for a portion of the channel. |
| Intermittent | Flow is present during extended periods of time during some seasons, but gradually returns to a state of isolated pools in the channel or a dry channel. There may be indications of subsurface flow. |
| Ephemeral | Flow is often not present during the majority of the year, and only occurs after a precipitation event. Channels of ephemeral streams will be dry with no evidence of isolated pools of water. |

All flowing waterbodies (streams and ditches, but not ponds) delineated in the Project Area with a drainage area less than one square mile were assessed using the Headwater Habitat Evaluation Index (HHEI). The HHEI allows for uniform scoring of various waterbodies using a standard methodology that identifies pertinent information about the waterbody including substrates, pool depths, and ecological value or condition. A revision of the "Field Methods for Evaluating Primary Headwater Streams in Ohio"

(OEPA 2018) no longer assigns a stream as a Class I, II, or III but instead classifies streams into three types. A summary of the types of primary headwater streams is provided in Table 2-3.

Table 2-3 Three Basic Types of Primary Headwater Streams

| Types | Definition |
|-----------------------------------|---|
| Ephemeral Aquatic Streams | Where flow is temporary and in direct response to precipitation or snow melt; otherwise normally a dry channel. |
| Small Drainage Warm Water Streams | Where flow is primarily derived from surface runoff, or if perennial, derived from shallow groundwater such that the ambient stream temperature is warm in the summer. Thermal regime is more responsive to seasonal changes in ambient air temperatures. |
| Spring Water Stream | Where flow is primarily derived from deeper groundwater and remains cool in the summer. Thermal regime is more resistant to seasonal changes in ambient air temperatures. |

Larger features were evaluated using the Qualitative Habitat Evaluation Index (QHEI). The QHEI form is used to describe similar aspects of waterbodies, but is focused on larger (often higher quality) waterbodies. Typically, QHEI forms are completed only for those perennial features with drainage areas greater than one square mile and pools deeper than 40 centimeters (approximately 15 inches). In cases where a feature scored highly on the HHEI forms and failed to meet either of QHEI criteria, however, they were still evaluated with the QHEI to better record the conditions present. Table 2-4 provides an overview of the typical score ranges and waterbody classifications under QHEI.

Table 2-4 Qualitative Habitat Evaluation Index (QHEI) Scoring

| Final QHEI Score | Definition |
|------------------|---|
| <32 | Limited Resource Water (LRW) |
| 32 - 60 | Modified Warm Water Habitat (MWH) |
| 60 - 75 | Warm Water Habitat (WWH) |
| >75 | Possible Exceptional Warm Water Habitat (EWH) |

2.2.3 Ohio Mussel Survey

All native mussels in the State of Ohio are protected per Ohio Revised Code Section 1533.324, as are the 10 federally protected species which may occur in the state. In order to protect these species, the Ohio Department of Natural Resources' Division of Wildlife (ODNR DOW) and USFWS developed a series of survey protocols to identify the presence or absence of mussels in a waterbody, as detailed in the Ohio Mussel Survey Protocol (ODNR 2018). The protocols identify five types of streams based on their size and potential for federally listed species (FLS), as shown in Table 2-5.

Table 2-5 Stream Classifications according to Mussel Survey Protocol, per ODNR and USFWS

| Group | Definition |
|----------|---|
| Unlisted | Streams not listed in the Survey Protocol, having a watershed larger than 10 square miles with the potential for mussels, but no FLS are expected |
| Group 1 | Small to mid-sized streams, FLS not expected |
| Group 2 | Small to mid-sized streams, FLS expected |
| Group 3 | Large Rivers, FLS not expected |
| Group 4 | Large Rivers, FLS expected |

Such mussel surveys are required to be conducted by trained and accredited individuals, with the group of streams determining exact scale of surveys required. The unlisted streams and Group 1 streams may have visual reconnaissance surveys completed, with the results being forwarded to ODNR who then determine need for any additional surveys. All Group 2, 3, and 4 streams require a full survey.

Cardno field staff conducted only visual reconnaissance surveys for this Project as part of the typical delineation process. If any mussels are found during stream delineations and if the stream is to be impacted, Cardno identifies the stream for a follow-up survey. The survey protocol notes that use of horizontal directional drill (HDD) to cross a stream eliminates the need for surveys, and streams with a drainage area less than 10 square miles also do not require surveys. Based on this criteria, full mussel surveys are not required for the waterbodies identified within the Project Area.

None of the delineated streams within the Project Area met the requirements for mussel survey. During the field surveys, Cardno observed no individuals or populations of freshwater mussel species.

2.2.4 Jurisdictional Determination

While Cardno cannot formally determine the jurisdictional status of a waterbody or wetland, Cardno has identified features in the Project Area it considers potentially jurisdictional. Any determination made by the USACE would be binding however, and may vary from Cardno's interpretation. Our interpretation is made based on available documentation from the U.S. Environmental Protection Agency, including guidance on the "Current Implementation of Waters of the United States (WOTUS)" which refers to the original 1986/1988 promulgation and subsequent Supreme Court cases which further defined the term, with the most current being the June 2020 ruling. The 2020 ruling simplified the definition of Waters of the U.S. and jurisdictionality to mean:

1. The territorial seas and traditional navigable waters;
2. Perennial and intermittent tributaries to those waters;
3. Certain lakes, ponds, and impoundments that contribute surface water flow in a typical year to a territorial sea or traditional navigable water; and
4. Wetlands adjacent to jurisdictional waters, separated by a natural berm, bank, or natural feature, or by an artificial dike or barrier, so long as the structure allows for a direct hydrological surface connection to waters described in the above sections 1 through 3.

The 2020 ruling also details twelve (12) categories of exclusions (i.e., features not considered "waters of the U.S.")

1. All waters or features not defined by the 2020 rule;
2. Groundwater, including groundwater drained through subsurface drainage systems;
3. Ephemeral features that flow only in direct response to precipitation, including ephemeral streams, swales, gullies, rills, and pools;
4. Diffuse stormwater runoff and directional sheet flow over upland;
5. Ditches that are not traditional navigable waters, tributaries, or that are not constructed in adjacent wetlands, subject to certain limitations;
6. Prior converted cropland;
7. Artificially irrigated areas that would revert to upland if artificial irrigation ceases;
8. Artificial lakes and ponds that are not jurisdictional impoundments and that are constructed or excavated in upland or non-jurisdictional waters;

9. Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel;
10. Stormwater control features constructed or excavated in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run- off;
11. Groundwater recharge, water reuse, and wastewater recycling structures constructed or excavated in upland or in non-jurisdictional waters; and
12. Waste treatment systems.

Although no navigable WOTUS were identified in the Project, some could be considered tributaries that eventually flow into a WOTUS. Tributaries themselves may not be navigable, but have a significant impact on water quality 'downstream' in the WOTUS. Status as a tributary was primarily assessed on the presence or absence of a USGS NHD blue line feature and possibility for flow into a larger WOTUS. Additionally, if the waterbody or wetland abutted a potentially jurisdictional feature and had a permanent or potentially permanent hydrologic connection, then both waterbodies would be considered jurisdictional. For clarity, any features identified as jurisdictional, will be referred to as jurisdictional for the purposes of this wetland delineation report. However, final determinations of jurisdiction are the responsibility of the USACE. Any determination made by the USACE would be binding and modifications to a feature's jurisdictional status that varies from Cardno's would have to be honored.

3 Desktop Assessment Results

Multiple sources were reviewed prior to field investigations to identify potential resources as part of a preliminary desktop assessment. The findings of the desktop assessment were also verified during the field surveys.

3.1 National Land Cover Database Review

Based on a review of available aerial imagery, the Project Area appeared to generally occur in cultivated crop areas. Review of the 2016 NLCD (Multi-Resolution Land Characteristics Consortium [MRLC] 2016) confirmed this assessment, which showed that cultivated crops accounted for approximately 96% of the total acreage in the Project Area. The second most prominent land use within the Project Area was classified as “Developed, Open Space” which accounted for 4% of the acreage. The classification “Developed, Open Space” refers to “areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses” (Homer et al. 2015). All other land use activities accounted for less than 1% of the total acreage in the Project Area. A summary is provided in Table 3-1.

Table 3-1 Land Use within the Project Area

| Type | Project Area (acres) | Project Area (%) |
|--------------------------|----------------------|------------------|
| Cultivated Crops | 641.83 | 96% |
| Developed, Open Space | 27.35 | 4% |
| Deciduous Forest | 0.22 | <1% |
| Developed, Low Intensity | 0.44 | <1% |
| Herbaceous | 0.22 | <1% |
| TOTAL | 670.08* | 100% |

Compiled from MRLC 2016.

* The total acreage used in these calculations differs slightly from the project area due to tiny differences inherent to the level of precision of the National Land Cover Dataset.

The field team observed that the land use in the Project Area closely matched the remote land use data described above.

3.2 Geology

The Project is located in the Maumee Lake Plains Physiographic Regions of Ohio. The Maumee Lake Plains is a flat-lying Ice-Age lake basin with beach ridges, bars, dunes, deltas, and clay flats. It is characterized as having slightly dissected by modern streams. This area once contained the former Black Swamp. Elevations range from 570 to 800 feet, with very low relief (5') (ODGS 1998; 2006; 2021).

3.3 Soils & Hydric Ratings

Cardno reviewed soil types for the Project Area using the Web Soil Survey, an application of the USDA NRCS (2021). Fifteen soil types were identified (Table 3-2). Although no fully hydric soils were identified in the Project Area, six soils have a Hydric Rating of 60 or greater and occupy a total of 71.6% of the Project Area. The poor draining qualities of hydric soils combined with local flat or bowl-shaped topography can make locations predisposed to wetlands.

Table 3-2 Soils within the Project Area

| Type | Map Unit Description | Hydric Rating | Acreage | Percentage of Project Area |
|------|--|---------------|--------------|----------------------------|
| CcA | Colwood fine sandy loam, 0 to 1 percent slopes | 95 | 40.6 | 6.0% |
| Gpa | Granby loamy fine sand, till substratum, 0 to 1 percent slopes | 90 | 1.4 | 0.2% |
| HoA | Hoytville clay loam, 0 to 1 percent slopes | 90 | 113.1 | 16.9% |
| MfA | Mermill-Aurand complex, 0 to 1 percent slopes | 60 | 231.4 | 34.5% |
| OtA | Ottokee-Spinks loamy fine sands, 0 to 2 percent slopes | 0 | 14.9 | 2.2% |
| OtB | Ottokee-Spinks loamy fine sands, 2 to 6 percent slopes | 0 | 31.5 | 4.7% |
| RfA | Rimer and Tedrow, till substratum, loamy fine sands, 0 to 2 percent slopes | 10 | 61.8 | 9.2% |
| RfB | Rimer and Tedrow, till substratum, loamy fine sands, 0 to 2 percent slopes | 10 | 9.2 | 1.4% |
| SdA | Seward and Ottokee, till substratum, loamy fine sands, 0 to 2 percent slopes | 10 | 2.1 | 0.3% |
| SdB | Seward and Ottokee, till substratum, loamy fine sands, 2 to 6 percent slopes | 10 | 16.2 | 2.4% |
| SsB | Spinks loamy fine sand, 2 to 6 percent slopes | 0 | 26.4 | 3.9% |
| TeA | Tedrow loamy fine sand, 0 to 2 percent slopes | 10 | 19.8 | 2.9% |
| TeB | Tedrow loamy fine sand, 2 to 6 percent slopes | 0 | 8.8 | 1.3% |
| WnA | Wauseon fine sandy loam, deep to till, 0 to 1 percent slopes | 90 | 20.6 | 3.1% |
| WyA | Wauseon fine sandy loam, 0 to 1 percent slopes | 93 | 73.1 | 10.9% |
| | | TOTAL | 670.6 | 100% |

Compiled from USDA 2021.

3.4 Navigable Waters

The vast majority of the Project Area is located within the Lower Beaver Creek watershed (Hydrologic Unit Code [HUC] -04100009050) and smaller portions of the Project Area are within the Cutoff Ditch (HUC-041000090507) and Tontogany Creek (HUC-041000090601) watersheds. All of these streams are located within the larger Maumee River drainage basin, which ultimately drains northeast into western Lake Erie. No navigable waterways are located within the Project Area. Cutoff Ditch is the only named feature in the Project Area with a designated use, and is identified as warmwater habitat (WWH) based on the OEPA Water Quality Standards (OEPA 2017).

3.5 Remote Wetland and Waterbody Identification

Prior to site investigations, the Project Area was screened using the USFWS NWI (2017) and USGS NHD (2021) remote data for potential wetlands and waterbodies in the vicinity of the Project. The NWI and ODNR data shows remotely identified wetlands, which may be based on previous aerial imagery interpretation and soils surveys, while the NHD uses digital stream information to identify potential waterways.

Few wetlands and waterbodies were identified within the Project Area. The majority of the waterbodies remotely identified appeared to be headwater tributaries to Beaver Creek. All of the wetlands identified by ODNR overlapped with NWI features. NWI and ODNR wetlands are shown on the Wetland and Waterbody Maps included in Appendix B.

3.6 Desktop Review Summary

The desktop review indicated minimal wetlands located within the Project Area. The area also included a few streams running between crop areas. It is not uncommon for the NHD set to indicate features that are no longer present due to landowners rerouting the channel or moving it underground via tiles. Much of the Project Area, however, is cultivated crop area that limits the development of wetlands. The remotely identified features and land use information was expected given the region's heavy, historic manipulation of land use to accommodate and maintain farming operations.

4 Field Survey Results

The following is a summary of the results of field surveys conducted in October 2020 within the Project Area. Climatic conditions were considered wetter than normal during the survey periods. Appendix A contains representative photographic documentation of the delineated wetland and waterbody features. Appendix B contains maps depicting the delineated wetlands and waterbodies. Appendix C contains the completed routine wetland data from the field efforts and Appendix D contains stream assessment forms.

4.1 General Habitat within the Project Area

The data obtained during the desktop review was found to be generally consistent with the results of the field survey. As identified in Table 3-1, the predominant land use in the Project Area is agricultural (crops).

The agricultural fields were observed to be primarily a mix of remnants from the previous year's soybean and corn crops. Additionally, some crop areas were actively planted with winter wheat. It is likely that the type of crop changes seasonally, but the general extent of the cultivated area remains roughly the same. Many of the cultivated areas and roadsides have grassy swales, which helps maintain drainage for proper growing conditions. These swales often had a mix of herbaceous species, most consisting of various turf grasses (primarily *Festuca* sp.). The swales appear to be mowed seasonally. Vegetation in the narrow woodlots was characterized by intrusion of weedy species from nearby crop edges including: Canada goldenrod (*Solidago canadensis*), smooth brome (*Bromus inermis*), Queen Anne's lace (*Daucus carota*), and common teasel (*Dipsacus fullonum*). Where limited woody vegetation and shrub growth was observed, species included honey locust (*Gleditsia triacanthos*) and white mulberry (*Morus alba*).

The majority of the wooded areas within the Project Area occur along adjacent properties with a few isolated woodlots between cultivated fields and near residential homes. Aggressive weedy species such as smooth brome (*Bromus inermis*), blackberry (*Rubus* sp.), and poison ivy (*Toxicodendron radicans*) occurred often along the woodlot edges, with the interiors of woodlots comprised predominately of spruce (*Picea* sp.), oaks (*Quercus* sp.), slippery elm (*Ulmus rubra*), white mulberry (*Morus alba*), and a few shagbark hickories (*Carya ovata*).

The habitats surveyed during field efforts appear to lack significant or obvious evidence of RTE species. Visual reconnaissance surveys were conducted during the wetland and waterbody delineations and no RTE species were observed. The modification of the majority of available habitat has likely degraded the quality and limited the potential for RTE habitat. Wooded areas in the Project Area were typically of low quality, with isolated occurrences of relatively large high quality trees surrounded by younger second growth forest and saplings. The delineated waterbodies could potentially provide RTE species habitat, but at reduced quality due to the surrounding land use impacting the water chemistry (i.e., high sediment loading during storms and fertilizer in runoff). During the field surveys, Cardno staff observed minimal wildlife use in the Project Area and observed no Federally-listed RTE species due to the area being relatively low quality and highly disturbed.

4.2 Description of the Delineated Wetlands in the Project Area

There were no wetlands found within the Project Area during the field survey.

4.3 Description of the Delineated Waterbodies in the Project Area

A total of 6 waterbodies were delineated during field surveys; 1 stream and 5 ditches (see Figure 4-1). The waterbody delineation results are summarized in Table 4-2. Representative photographs of typical waterbodies can also be found in Appendix A. Waterbodies were delineated in the field and further categorized for the report as either streams or ditches.

Ditches are identified as man-made or modified channels, which were manipulated by landowners or communities to improve drainage among farm fields. Modification to channels could include the mowing of bank vegetation, altering of channel morphology, or removal of debris to maintain flow conditions. Many ditches have ephemeral or intermittent flows and heavily vegetated channels. Most ditches also have trapezoidal cross sections, with a small bankfull width/channel at the bottom and a wider crossing distance at the top-of-bank. If a ditch crosses under a road, the deepest pools of water are normally located at the edges of the culverts, which occur as a result of eddies and currents of stormwater flow creating erosion. At the time of the survey, most were flowing due to the recent rains and saturated soils.

Streams are considered natural channels if they have not had any modification or have shown indication of recovery following historic modification. Streams possess a “ordinary high water mark” as defined by the USACE 33 CFR 328.3(e) as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. Additionally, streams are more likely to have vegetated riparian buffers along the banks, variety of substrates in the channel, and pools of water which might support aquatic species. Some streams were flowing at the time of the survey, with slightly elevated turbidity, which was attributed to runoff from nearby ditches and cultivated areas during recent precipitation events.

The OEPA’s HHEI forms were completed for each stream and ditch with a drainage area of less than one square mile, whereas larger features with greater than one square mile drainage area were evaluated using OEPA’s QHEI forms.

The types and percent composition of substrates, maximum pool depth, and average bank full width are scored on the HHEI forms. Additional descriptive information is recorded in the forms regarding flow regime, riparian width and quality, morphology, and modification. Stream channel modification is referenced in many of the descriptions below, as either ‘naturalized’ or ‘modified’. Naturalized features are those that have either never been modified or have historic signs of modification, but appear to have recovered to a natural state. Modified features are those that appear to have recently been modified (such as through dredging or armoring of the banks) and may have little to no evidence of recovery. Scores are tallied for each feature and with the use of the HHEI Flow Chart (OEPA 2018) a type of primary headwater habitat (PHWH) stream is assigned as described in Section 2.2.2.

For larger features, the types and percent composition of substrates, instream cover, channel morphology, bank erosion and riparian zone, pool/glide and riffle/run quality, and gradient drainage area are scored on the QHEI forms. Additional descriptive information is recorded in the forms regarding canopy, aesthetics, clarity, maintenance, and measurements. Scores are tallied for each feature which is then categorized as one of the following: limited resource water (LRW), modified warmwater habitat (MWH), WWH, and possible exceptional warmwater habitat (EWH) as described in Section 2.2.2.

While delineating the waterbodies in the Project Area, Cardno evaluated the features for suitability as habitat for RTE species, including mussels. Due to the modification and disturbance present in the surrounding area, none of the waterbodies were identified as highly likely to serve as habitat for any RTE species. A dominance of silty substrates in the majority of waterbodies also limited potential RTE occurrence. Typically, a stream has a slightly higher potential for providing suitable habitat to RTE species (such as freshwater mussels and snakes) compared to the more modified ditches, but none were observed in or near waterbodies during the field surveys. Frequently, a waterbody may be able to provide physical habitat, but lacks suitable water chemistry due to intensive land use in the upland areas.

A total of six waterbodies were delineated in the Project Area. One stream (Cutoff Ditch) was classified as MWH. Of the ditches, one was classified as a modified ephemeral ditch, one as a modified small drainage warmwater ditch, and three as limited resource waters.

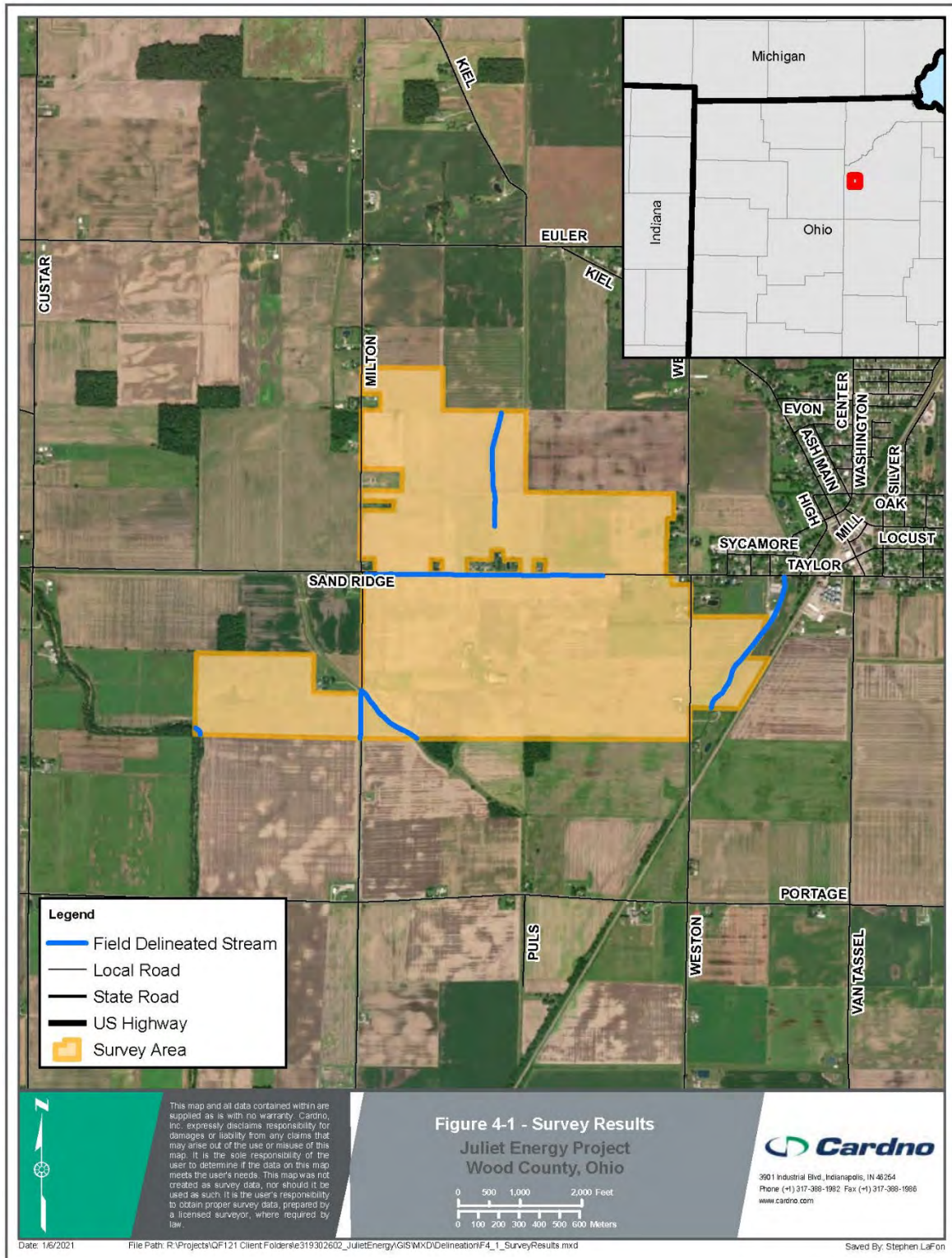


Figure 4-1 **Survey Results**

Table 4-2 Waterbodies Delineated in the Project Area

| Stream ID | Type | Linear Feet in Project Area | HHEI Score | QHEI Score | PHWH Stream Type* | Flow Regime | Drainage Basin | OEPA Watershed Eligibility | Drainage Area (mi²) | Stream Name | Anticipated Jurisdictional? | Potential RTE Habitat | Mussels Observed | S R W H | W W H | E W H | M W H | S W H | C W H | L R W S | P W S | A W S | I W S | B W R | P C W | S C R |
|-------------------|--------|-----------------------------|------------|------------|--|--------------|-----------------------------|----------------------------|---------------------|------------------------|-----------------------------|-----------------------|------------------|---------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|
| S001 | Ditch | 1,470 | N/A | 22 | N/A | Perennial | Tontogany Creek | Eligible | 4.85 | UNT to Tontogany Creek | Yes | Low | No | | | | | | | | | | | | | |
| S002 | Ditch | 1,217 | N/A | 22 | N/A | Perennial | Beaver Creek – Maumee River | Eligible | 3.8 | UNT to Cutoff Ditch | Yes | Low | No | | | | | | | | | | | | | |
| S003 | Ditch | 729 | N/A | 21 | N/A | Perennial | Beaver Creek – Maumee River | Eligible | 1.71 | UNT to Cutoff Ditch | Yes | Low | No | | | | | | | | | | | | | |
| S004 | Ditch | 3,833 | 27 | N/A | Modified Ephemeral Stream | Intermittent | Beaver Creek – Maumee River | Eligible | 0.6 | UNT to Beaver Creek | Yes | Low | No | | | | | | | | | | | | | |
| S101 | Ditch | 1,868 | 52 | N/A | Modified Small Drainage Warmwater Stream | Intermittent | Beaver Creek – Maumee River | Eligible | 0.55 | UNT to Beaver Creek | Yes | Low | No | | | | | | | | | | | | | |
| S102 | Stream | 137 | N/A | 57.5 | N/A | Perennial | Beaver Creek – Maumee River | Eligible | 5.25 | Cutoff Ditch | Yes | Moderate | No | | | | | X | | | | X | X | | X | |
| Total Linear Feet | | 9,253 | | | | | | | | | | | | | | | | | | | | | | | | |

*HHEI scores are used in the HHEI Flow Chart to determine type of PHWH stream (OEPA 2018).

QHEI – Scoring

| |
|--|
| < 32: Limited Resource Water (LRW) |
| 32 to 60: Modified Warmwater Habitat (MWH) |
| 60 to 75: Warmwater Habitat (WWH) |
| > 75: Possible Exceptional Warmwater Habitat (EWH) |

Notes:

| | |
|-------------------------------------|---|
| N/A – Not Applicable | PWS - Public Water Supply |
| WWH – Warmwater Habitat | AWS – Agricultural Water Supply |
| EWH – Exceptional Warmwater Habitat | IWS – Industrial Water Supply |
| MWH – Modified Warmwater Habitat | BW - Bathing Waters |
| SSH – Seasonal Salmonid Habitat | PCR – Primary Contact Recreations |
| SRW - State Resource Water | SCR – Secondary Contact Recreation |
| CWH – Cold Water Habitat | UNT – Unnamed Tributary |
| LRW – Limited Resource Water | HHEI – Headwater Habitat Evaluation Index |
| | QHEI – Qualitative Habitat Evaluation Index |

5 Conclusions

The Project Area is dominated by agricultural land use (cultivated crops) with a few isolated woods. The quality of forested areas and streams varied across parcels. The history of land conversion for farming and other landscape manipulation to support farming operations has reduced the land available for wetlands to develop.

In summary, Cardno delineated 6 waterbodies (1 stream and 5 ditches) with all expected to be jurisdictional due to their potential hydrologic connection to a WOTUS. Final verification of waterbody boundaries for regulatory purposes can only be completed through a Jurisdictional Determination (JD) review by the USACE or its duly appointed representative.

During the field surveys, Cardno did not observe any RTE species in the Project Area or vicinity; no freshwater mussel species were observed in the waterbodies in the Project Area. The fragmentation of wooded habitats by roads, residential land use, and farm fields reduces the likelihood of significant wildlife occurring in the Project Area.

The findings of this investigation represent a study of the Project Area for non-tidal wetlands and waterbodies. The findings depend on the season, the conditions at that time of year, site-specific influences (e.g., anthropogenic disturbance), and individual professional judgment. This report represents a professional estimate of the Project Area wetlands and waterbodies based upon available information and techniques. Final verification of their boundaries for regulatory purposes can only be completed through a JD review by the USACE or its duly appointed representative.

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Teresa Orahod on behalf of Dylan F. Borchers